

# AUTOMOTIVE INDUSTRIES

**AUTOMOBILE**

Volume 66

Reg. U. S. Pat. Off.

Number 20

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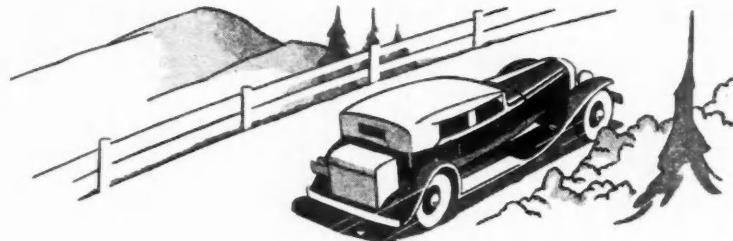


**Everybody who  
knows Mather  
Springs has a good  
word for them.**

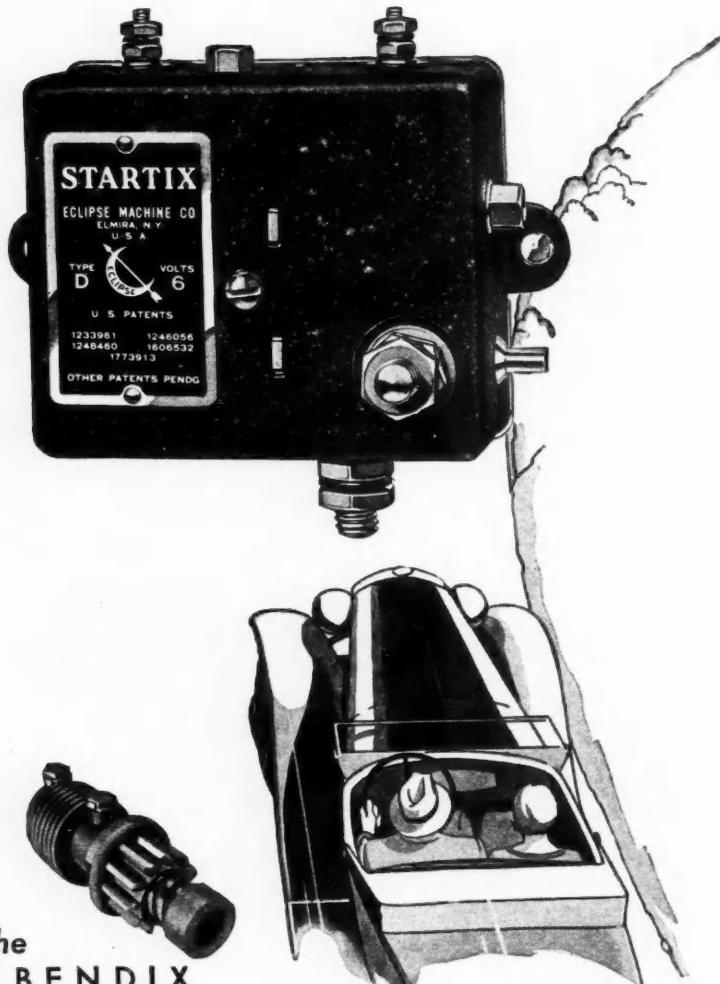
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May 14, 1932

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# BENDIX

A U T O M O B I L E

*Automotive Industries*

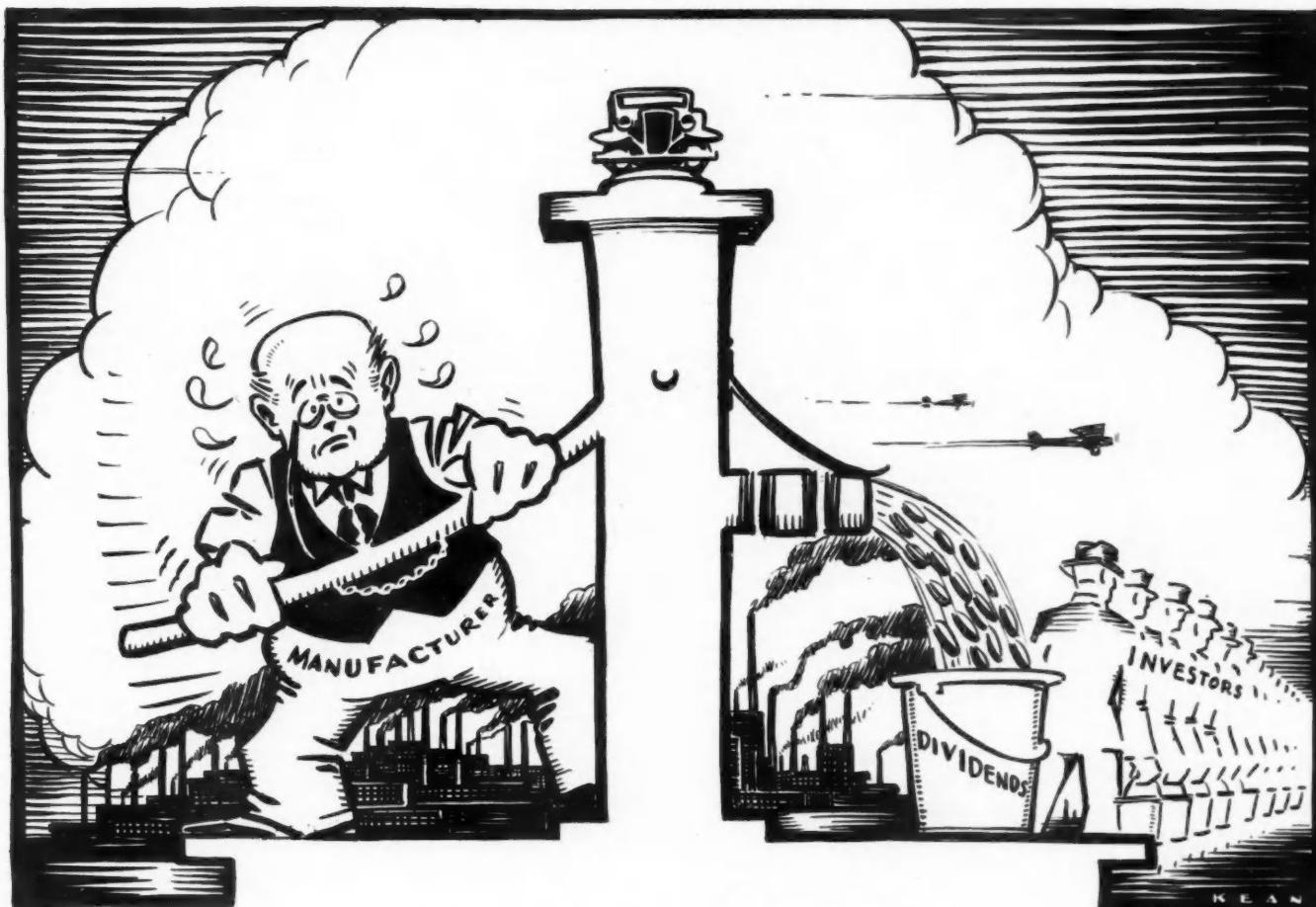
# AUTOMOTIVE INDUSTRIES

Vol. 66, No. 20

• THIRTY-THIRD YEAR •

May 14, 1932

## Four Car Makers Still Continue Dividends, Despite Low Profits



Replacement sales help parts builders to best car company nets as reports detail dismal first quarter showings.

by Norman G. Shidle

THE first quarter of 1932 was featured by slashed and omitted dividends, declining profits and heavy losses, and general financial gloom in the automotive industry. The outlook for the second quarter, so far as net earnings are concerned, indicates only moderate general betterment.

Total returns aren't in for the first quarter, but enough companies have been heard from to insure the accuracy of the foregoing statement. The passenger car companies were hit worse than any other element in the industry, some of them recording losses during

the first three months as large as their handsome yearly profits once were in the good old days.

A group of seven leading parts companies, driving hard on replacement business while original equipment shipments were at low ebb, managed to net just over \$700,000 in the first quarter as against a total of close to \$900,000 in the first three months of last year. While the earnings of these companies reflected clearly the huge decline in car and truck production, they were, as a group, able to combine economies in production with efforts in the replacement field with

## Composite First-Quarter Earnings, 1931-1932

Company	Net Earnings—1st Quarter 1931	Net Earnings—1st Quarter 1932	Earned Per Share —1st Quarter 1931	Earned Per Share 1932	Quarterly Div. Rate
Auburn (Feb. 29) . . . . .	\$ 202,409	\$ 7,959	1.06	.04	+\$1.00
Chrysler . . . . .	—979,927	—2,066,485	—.22	—.47	.25
Graham . . . . .	—178,523	166,589	—.16	.05	0
Hudson . . . . .	226,395	—1,245,943	.14	—.81	0
Hupp . . . . .	—680,911	—596,176	—.47	—.45	0
Nash (Feb. 29) . . . . .	1,099,194	211,927	.40	.08	.50
Packard . . . . .	113,004	—1,563,983	.007	—.10	0
Pierce-Arrow . . . . .	306,449	—193,534	1.01†	—1.52‡	0
Reo . . . . .	—420,832	—753,277	—.21	—.42	0
Studebaker . . . . .	809,749	—484,125	.36	—.31	0
Willys-Overland . . . . .	117,106	—1,032,395	—.04	—.42	0
Peerless . . . . .	—114,221	—67,001	—.27	—.21	0*
<b>TOTAL — Less General Motors Corp.</b> . . . . .	<b>\$ 499,892</b>	<b>\$ 7,616,444</b>			
<b>General Motors Corp.</b> . . . . .	<b>28,999,409</b>	<b>9,693,027</b>	<b>.61</b>	<b>.17</b>	<b>.50</b>
	<b>\$29,499,301</b>	<b>\$ 2,076,583</b>			

\* A special distribution of \$3 a share was declared payable April 25th, 1932. No previous payments have been made since 1924.

† Plus 2 per cent in stock.

‡ Class A stock.

Company	Net Earnings—1st Quarter 1931	Net Earnings—1st Quarter 1932	Earned Per Share —1st Quarter 1931	Earned Per Share 1932	Quarterly Div. Rate
Libbey-Owen-Ford . . . . .	\$—188,072	\$ 44,230	—.08	.02	0
Eaton Mfg. Co. and W-R Corp. . . . .	217,373	57,521	.31	.04	.125
Bohn Aluminum & Brass . . . . .	437,296	—73,201	1.24	—.21	0
Borg-Warner Corp. . . . .	329,776	170,220	.21	.09	.25
Parker Rust-Proof Co. . . . .	200,830	96,116	2.10	.97	
Electric Auto-Lite Co. . . . .	1,169,762	547,680	1.23	.53	1.00
Thermod . . . . .	—101,679	—106,685	—.61	—.63	
<b>TOTAL</b> . . . . .	<b>\$ 895,524</b>	<b>\$ 735,881</b>			

sufficient effectiveness to leave some margin of profit at the end of the most trying three months in automotive history.

The showing of these particular parts makers—if it can be considered typical of the parts industry as a whole—is particularly impressive when it is realized that the demands for engineering development and service to manufacturer accounts continue to increase steadily as vehicle factory research and engineering forces are cut to an irreducible minimum.

Combined statements of Auburn, Chrysler, Graham, Hupp, Nash, Packard, Reo, Studebaker and Peerless for the first quarter of 1932 show a net loss of \$5,084,-571. Last year combined, these same companies managed to end the quarter with a deficit of only \$130,058.

The outstanding favorable performance among car builders for the quarter was Graham's record in reversing a 1931 first quarter deficit of \$178,523 into a profit of \$166,589 this year. This company is said now to be so organized as to produce a profit with a yearly volume of 20,000 cars.

Nash, although engaged in waiting to announce a new model during most of the period covered by its first quarter which ends Feb. 29, turned up with a profit slightly in excess of \$200,000. Auburn, which

led the parade last year and was one of three companies to earn its common stock dividend in the first quarter of 1931, this year just got over the line with a net of \$7,959. It paid both its cash dividend of \$1 a share and its stock dividend of 2 per cent just the same, though.

Hupp shaved its losses slightly as compared to last year, Reo went further in the red, Studebaker took nearly half a million loss as against more than \$800,000 profit, Chrysler lost over \$2,000,000, Packard recorded a deficit of over a million and a half dollars, while General Motors, giant that it is, slumped to \$9,693,027 profit as against almost \$29,000,000 last year. It earned 17 cents a share and paid 25 cents.

The seriousness of the losses sustained by the industry as a whole during the last three months is made vivid when one realizes that earnings of representative car makers in the first quarter of 1931 were 45 per cent under those of 1930. Now currently available 1932 first quarter totals, exclusive of General Motors, show a deficit of \$7,616,444 as against a profit of \$499,892 last year.

Only four passenger car companies remain on a dividend basis, so far as common stock is concerned: Auburn, Nash, Chrysler and General Motors. And not one of those companies came anywhere near to earning at the present rate of payment. To pay dividends for the current quarter approximately the following sums had to be dipped from reserves:

Auburn . . . . .	\$199,000
Nash . . . . .	1,046,000
Chrysler . . . . .	1,103,000
G. M. . . . .	3,480,000

Last year at the end of the first three months nine passenger car companies still were on a common stock dividend basis.

To rehearse in greater detail the dismal profit picture of the first quarter of 1932 would be only to put oneself in the class of the chronic invalid who actually seems to enjoy ill health. And since there's nothing to indicate that our industry is chronically ill it would be foolish to do that.

Perhaps nothing indicates better the confidence of the general public in the final comeback of the automotive industry than the increasing numbers who are becoming stockholders in the major companies of the industry. Chrysler, for example, had 50,823 stockholders in April this year as against 45,929 at the same time in 1931. And while similar up-to-date figures are

(Turn to page 737, please.)

# JUST AMONG OURSELVES

## Controversy Rife On Technical Talks

LOOKS as though wear and tear on the golf links was going to be light at the Society of Automotive Engineers summer meeting down at White Sulphur Springs next month. With Bill Stout slated to talk about what automobiles ought to be like, and at least one other paper dealing specifically with automobiles of the future and final decision hoped for on a truck rating formula, it's hard to believe that the technical discussions won't be running on "far into the night." More light is going to be thrown on the constructive program which has been developed for testing high pressure lubricants, and the pros and cons of trailer operation are scheduled for debate by the transportation and truck men. Five or six other controversial topics are on the docket . . . but then you can read the program for yourself.

## "High Pressure" Can Mean Oils as Well as Sales

BUT speaking of high pressure lubricants, we have received from C. B. Veal, S. A. E. Research manager, a most lucid and vital picture of the exact purposes and progress of the work of the lubricants research subcommittee which has been dealing with this question for nearly a year now. We're planning to print some of it in an early issue.

Committee already has determined what information is available on the subject and outlined a program for carrying the work further. A major objective of

the program will be to develop a satisfactory yardstick for measuring the properties of high pressure lubricants. The Bureau of Standards will do the work under the direction of Dr. H. C. Dickinson.

## New Model Reasoning Upside Down in 1932

USUALLY new models are brought out by car companies to stimulate lagging sales. Midsummer announcements particularly have come mostly as attempts to bend upward a sales curve involved in taking its regular seasonal dip.

In this topsy-turvy year of 1932, we believe, just the opposite will be the case. If sales in general continue to be dull, there probably won't be any more new models to speak of much before late fall. Makers will conclude, and rightly, that new models couldn't be sold any better than old ones in a market armor-plated with sales resistance.

Should there be some indication of brisker selling, however, we may well find manufacturers scrambling to be first in the market with new sails set to catch the first breath of buying breeze.

## Production Totals Still Low in May

TOTAL output in May won't be a whole lot ahead of April unless an unexpected turn for the better comes in the last week or ten days of the month. Constant stepping up of output by Ford will be offset to some extent by shut-downs "for inven-

tory" by one or two big builders. About 120,000 cars were turned out in April. May totals look like 157,000 at the most, so far as we can see at present. That will be 44 per cent behind last May and will leave the industry just about 50 per cent behind last year in passenger car output for the first five months.

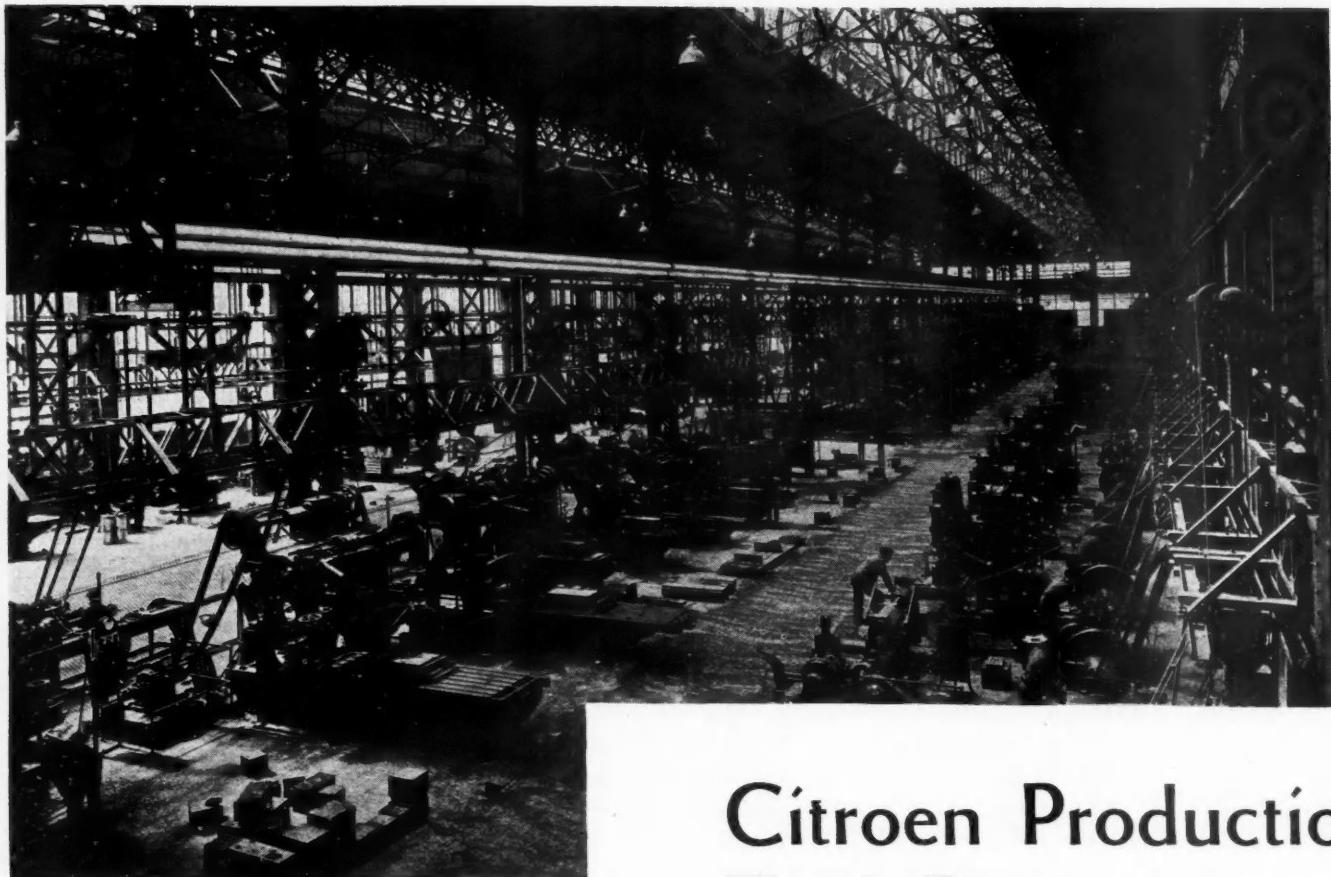
Trucks will be off just about the same per cent for the same five-month period, it now appears. Truck makers built 225,232 units in the January-May period of 1931; this year the total probably will be about 115,000.

## We Are Urged to Listen—Not Talk

HERE are paragraphs from one letter which was generated by the big advertising and sales smash projected by the industry early in April. This formerly-automotive Californian writes:

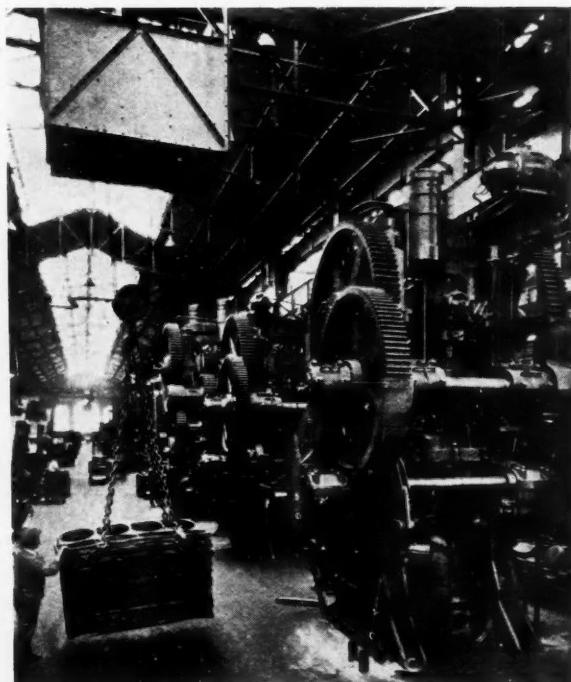
"Does it interest you to know that I feel the whole tremendous effort of supersalesmanship to be hopelessly beside the point, and, therefore, bound to fail? It seems to me that you, as an editor, with a remarkable record of adequately reflecting the feelings of the average executive in the industry, might for once try to put your ear to the ground and listen. Times are changing very fast now and it takes quite a little intuition to keep track of the trend.

"The industry has long held, in an abstract sort of way, that unless the consumer has money to spend, he cannot consume. But when it comes to providing him with the necessary cash, the industry isn't there. To cut our working time to six hours a day and five days a week, even if it means lower wages for the ones working full time now, to provide everybody with a job is the only way, as far as I can see, to lift the cloud of gloom."—N.G.S.



Maintenance tool and die making at the Citroen Clichy works occupies 65,000 sq. ft., employing 105 machine tools and a heat-treating department

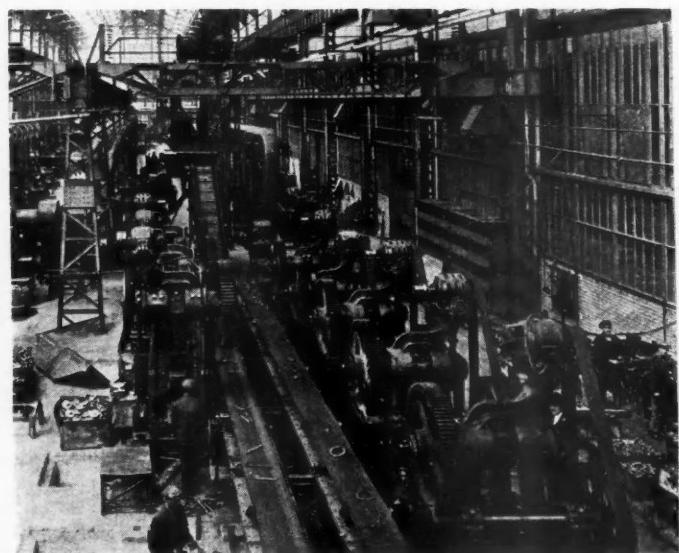
**Below**—A battery of huge Toledo presses in the shop at Les Epinettes stamping out brake drums

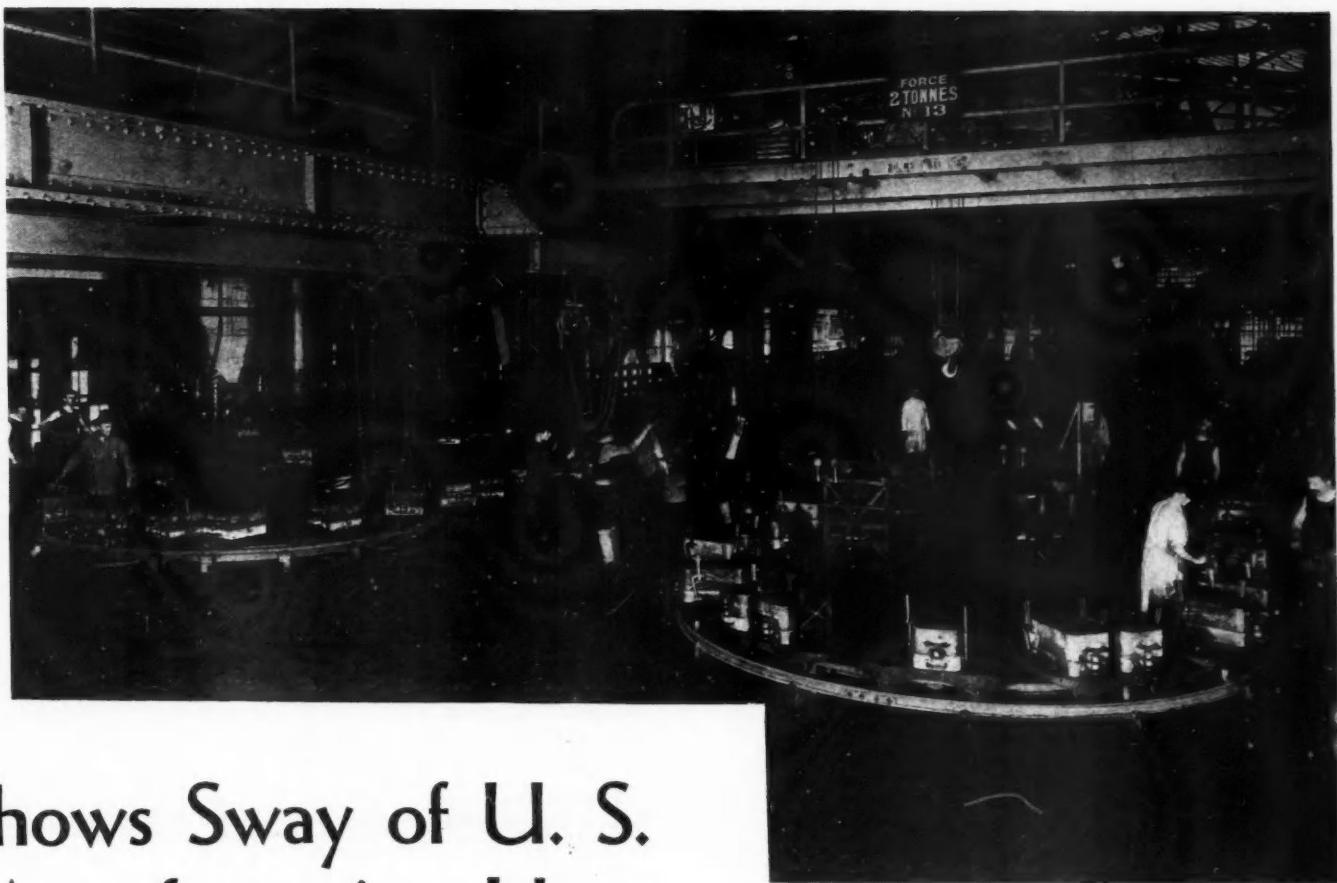


## Citroen Production Tool Designing and

Foremost European motor vehicle manufacturer is alert to newest methods, developing many of his own

**Below**—Trimming presses on both sides of a conveyor at Clichy





## Shows Sway of U. S. Manufacturing Ideas

Four groups of Paris plants are equipped with American machines and tools built by Citroen unit

by Joseph Geschelin

**A**NATURAL curiosity to see how the other half lives impelled us to inquire about the much-talked-of Citroen works. Accordingly when Andre Citroen visited Philadelphia last fall, he promised the writer a trip through his famed plants. Some time later it came—in the form of a beautiful folio of photographs and descriptive material which told an eloquent story.

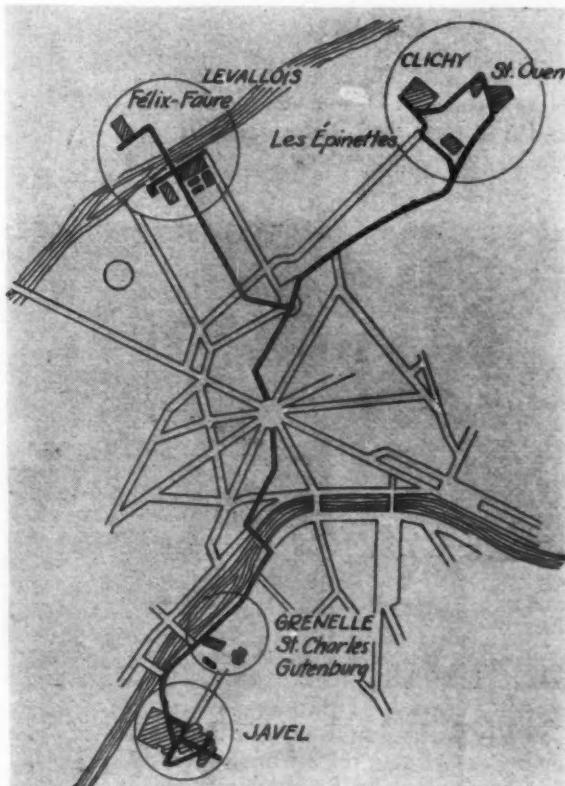
The first thing we learn is that the Citroen works consists of four distinct groups of plants fringing Paris and connected by an interplant bus line. Each one had a special function; the output of all flows to the southernmost plant, Usines de Javel, where the final assembly occurs.

M. Citroen has engineer-ambassadors who live in other plants and study and report on their methods; this is supplemented by groups of foreign engineers invited to study Citroen methods and suggest improvements.

One of the recent effects of this constant drive for

Merry-go-rounds in Clichy foundries assist production of 100 engine blocks per hour

Below—Map of Paris showing Citroen factories connected by an interplant bus line

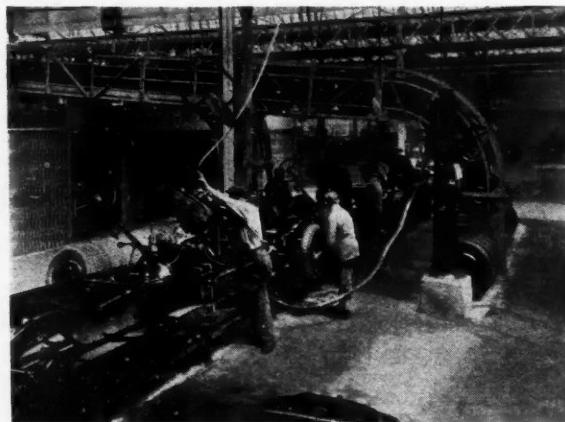




Waterbury upsetting machines at Levallois producing bolts and nuts, each equipped with feeding rolls, serving automatically from wire reels at the left



Individually-driven automatics in the Felix-Faure plant



Wheel chutes above the final assembly line at Javel are carefully designed. Note workman filling gasoline tanks and radiators just before wheels are bolted on



Cowdrey brake tester used in final assembly as Citroens roll off the line ready to dodge wild Paris taxicabs

improvement is the installation of an automatic bumper polishing plant. It is said to be the last word—this country has only one or two like it.

The works consists of four groups:

1. Clichy—comprising Clichy, Saint-Ouen, Les Epinettes.
2. Levallois—comprising two Levallois plants and Felix-Faure.
3. Grenelle—comprising Grenelle, St. Charles, Gutenberg.
4. Javel.

Each plant exemplifies specialization. Thus, in Group 1, Clichy is the source of all castings and drop-forgings. The foundry is geared to produce 100 cylinder blocks an hour. Output of the group is the equivalent of 1000 completed vehicles a day. Saint-Ouen with a grand total of 800 machine tools and 300 presses handles the fabrication of all-steel bodies, including welding and related processes. Stamping of side rails and brake drums is accomplished at Les Epinettes.

Group 2 is devoted to the manufacture of small parts and accessories such as electrical equipment, body trim, etc.

In Group 3, the Grenelle plant makes sub-assemblies such as transmissions, steering gears, etc. Gutenberg turns out engines.

Finally, we come to Group 4, Javel, which is the final assembly line of the works. Javel was built in 1915 for an output of 30 cars a day. By successive steps of improvement and modernization its capacity has been stepped up so that today it has an output of about 600 vehicles a day. This plant boasts 2500 machine tools and houses the central laboratory employing 150 engineers.

Looking around, the trained eye of the factory man will sparkle at the unmistakable presence of organization, orderliness, and clean-cut appearance of individual departments.

Here is a line of trimming presses in the same plant. Two rows of presses feed the belt conveyors between them, which serve the dual office of carrying away the scrap and transferring finished pieces to the washers. No materials handling problem here. Note how the belts travel on inclined rollers which give sufficient crown to prevent the work from spilling.

Over at the Usines Des Epinettes, in the same group, is this line of familiar Toledo presses 900 to 1200-ton capacity, knocking out the brake drums seen at the right. At the left, a stack of scrap blanks is being



Laboratory-like orderliness marks the heat-treating department at St. Charles. Note blackboard (upper left) giving required standards

hoisted on its journey to the plant's salvage section.

And to serve the whole is a maintenance and die-building department—65,000 sq. ft. of it in fact. This shop is completely equipped and manned to build and keep in repair all the tools and dies used in the press division. It contains a total of 105 machine tools of every description, lathes, millers, profiling machines and what not. In the background is a heat-treating department to complete the facilities.

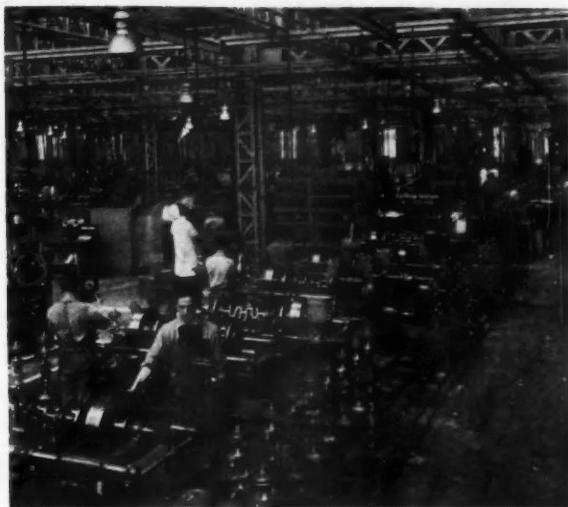
Activities in Group 2, Levallois, are represented by this huge automatic department with its mixture of individually driven and belt-driven machines found at Felix-Faure.

Now we come to a heat-treating department which in appearance and general air of precision might well be mistaken for a laboratory instead of a production line. This bay features two rows of electric furnaces of contemporary design disposed about a row of quenching tanks. The monorail at the left carries the work.

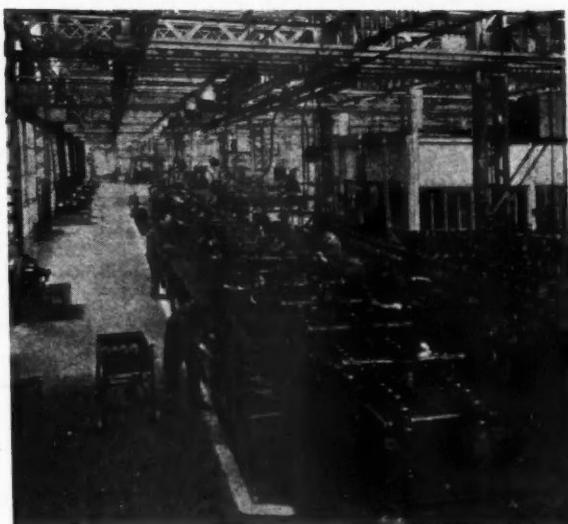
Heat treating of engine parts at Gutenberg is centralized in the compact unit shown at the right in Group 3. Small parts are case-carburized within the closed circuit at the left comprising a four-tunnel electric furnace, a roller conveyor loop, and a mechanized charging station.

They build in grand, sweeping style in France. Just look at this triple-deck building which houses the trim line. The first balcony handles seats and cushions. The trim line is below, and finished seats go to the assembly line on the balanced carriers via the monorail. On the second balcony items of trim are made.

Citroen has machine tool problems and a policy. Accordingly we inquired, "Mr. Citroen, is it a fact that you build many special machine tools in your own tool making department? If so, why is this policy necessary?" The answer is that European machine tool makers seem to lack the imagination needed in the development of new automatic machines, perhaps because of insufficient experience. American builders, on the other hand, while providing the inspiration for the intricate automotive machines that make mass production possible have not been able to compete with the cost of building in the Citroen shops. Here indeed is a challenge to the machine tool industry.



Gisholt balancing machines in the Gutenberg engine works of Citroen's Grenelle group



Rear axle assembly at the Grenelle plant. Air tools and handy bins of parts facilitate production



Triple-floor building in Javel trim plant. Smaller items made on top balcony; seats and cushions made on lower balcony and trim line is below. Handling is done on monorail

**Eastern Conference of Motor Vehicle Administrators held an important meeting in Washington, May 5 and 6**

Thomas H. MacDonald, Chief, Bureau of Public Roads:

Recommended liberalization of certain existing restrictions on movement of interstate traffic, and formation of national group of motor vehicle administrators.

Col. A. B. Barber, Director, National Conference on Street and Highway Safety:

Traced progress of Uniform Vehicle Code and other uniform legislation.

Said states in which driver's license with examination is mandatory are 25-35 per cent safer than others.

Hon. Benjamin G. Eynon, Commissioner of Motor Vehicles, Pennsylvania:

Introduced resolution asking formation of committee from Eastern Conference to meet with vehicle manufacturers on questions of vehicle design affecting highway safety.

ONE of the manifold hysterics which seized the Congress last week seemed to have effect on the meeting of the Eastern Conference of Motor Vehicle Administrators in Washington on May 5 and 6, at which 12 states and one Canadian province were represented. While it was pretty well understood before the conference began that a number of important controversial subjects were to appear on the agenda, the meetings got under way quietly. The fact that no resolution or other decision of the conference binds its membership to certain action tends to keep down the internal pressure.

Progress of the Uniform Vehicle Code and other legislation proposed by the National Conference on Street and Highway Safety was reviewed by Col. A. B. Barber, manager of the transportation department of the Chamber of Commerce of the U. S. A. and director of the National Conference on Street and Highway Safety. A tabulation used as an exhibit with Col. Barber's address is shown.

Most of the work of the conference of vehicle administrators was done in executive session, closed to the press and public. An authorized summary of the first day's meeting indicated that the resolution introduced by the Hon. Benjamin G. Eynon, Commissioner of Motor Vehicles of Pennsylvania, calling for the appointment of a committee of administrators to meet with a committee representing the automotive industry, was unanimously accepted by the conference. It was clear from the general tone of the conference that the administrators were not entirely pleased with recent emphasis on the power and speed of passenger cars, as touted in recent advertising, and that some settlement of this matter

# Administrators Ask

would be sought if a meeting with representatives of the vehicle manufacturers could be arranged. The broader aspects of the resolution call for a consideration of the whole problem of the relation of mechanical design of vehicles to safety on the road, particularly at high speeds now possible.

Discussion on Mr. Eynon's resolution, it is understood, brought out some dissatisfaction among the administrators on the score that the automotive industry annually dumps into the laps of motor vehicle regulating authorities the problem of dealing on the highways with a crop of new models, which, from the standpoint of the administrators, are an unknown quantity as to safety of operation, etc. Several administrators, it was brought out, had a staff of technicians at the last New York Automobile Show, in an attempt to analyze what might be expected in a performance way from the new cars.

Seeking of further information on the relation of motor vehicle design to safety on the highways,

## Status of State Motor Vehicle Laws May 1, 1932

Uniform Registration Act	Uniform Certificates of Title & Anti-Theft Act	Uniform Operators & Chauffeurs License Act	Uniform Act Regulating Operation of Vehicles on Highways	Model Ordinance Rules Included in State Laws
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### States Which Have Adopted the Uniform Vehicle Code or Substantial Portions Thereof

Ariz. 1927	Ariz. 1927	Ariz. 1927	Ariz. 1927	N. J. 1928
Colo. 1931	Del. 1929	Colo. 1931	Calif. 1931	Wis. 1929
Del. 1929	D. C. 1932	Del. 1929	Colo. 1931	.....
Idaho 1927	Idaho 1927	Ia. 1931	Del. 1929	.....
La. 1928	Nev. 1929	Kan. 1931	Idaho 1927	.....
N. M. 1929	N. M. 1929	Mich. 1931	La. 1928	.....
N. C. 1927	N. D. 1927	Ore. 1931	Mich. 1927	.....
N. D. 1927	Pa. 1927	Pa. 1927	Minn. 1927	.....
Pa. 1927	Va. 1928	Va. 1932	Neb. 1931	.....
Va. 1926	W. Va. 1930	N. M. 1929	N. M. 1929	.....
.....	.....	N. C. 1927	N. C. 1927	.....
.....	.....	N. D. 1927	N. D. 1927	.....
.....	.....	Ore. 1931	Ore. 1931	.....
.....	.....	Pa. 1927	Pa. 1927	.....
.....	.....	S. D. 1929	S. D. 1929	.....
.....	.....	Utah 1931	Utah 1931	.....
.....	.....	Va. 1926	Va. 1926	.....
.....	.....	Wis. 1929	Wis. 1929	.....

### States Which Have Made Some Changes in Their Laws Toward Conformity With the Uniform Vehicle Code

Nev. 1931	Ore. 1929	Ark. 1927	Me. 1929	Conn. 1929
Ore. 1929	.....	Ind. 1929	N. H. 1927	N. Y. 1929
.....	.....	Neb. 1929	N. J. 1928	.....
.....	.....	Nev. 1931	Wash. 1927	.....
.....	.....	S. C. 1930	.....	.....
.....	.....	Tenn. 1929	.....	.....
.....	.....	Wis. 1927	.....	.....

### States Which Previously Had Laws Providing for Certificate of Title or Ownership and/or Operators License With Mandatory Examination

Note: All states have some form of registration laws.	California Colorado Florida Georgia Indiana Maryland Michigan Missouri Montana N. Carolina Oklahoma S. Dakota Utah W. Virginia Wisconsin	Connecticut Dist. of Col. Maryland Massachusetts N. Hampshire New Jersey New York Rhode Island Vermont	Note: All states have some form of rules of the road and equipment requirement laws.
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# Less Talk of Speed

by Herbert Hosking

and conscious of the general lack of state resources for obtaining adequate technical information, the Eastern Conference passed a second resolution asking the Bureau of Public Roads of the Department of Agriculture to undertake one of the most elaborate traffic surveys ever conducted. Through it the motor vehicle administrators hope to get accurate data on a number of specific accident factors. Among the subjects which government experts are asked to determine are:

The relationship of automobile design and construction to safety when driven by the average operator at high speed.

Effect upon safety of new accessory developments for passenger cars, such as "doughnut" tires.

Brake efficiency, expressed in correct stopping distances, as related to present traffic conditions.

Relationship of traffic lane and intersection capacity to traffic safety.

The effect of the development of free wheeling as it may be applied to trucks and buses.

The conference will also enlist the aid of the Bureau of Standards, seeking to make use of data already accumulated on headlight dimming devices, etc.

Thomas H. MacDonald, chief of the Bureau of Public Roads, injected a virile note into the second day's conference with a recommendation that the Eastern Conference of Motor Vehicle Administrators form the nucleus for a national group.

"There seems to me to be a real need for organizations similar to your own in other regions of our country—perhaps even a national association in which the regional groups could maintain their identity and yet work together on questions which are of truly nation-wide scope. You in the Eastern Conference have pioneered the way, and shown the success which can attend intelligent cooperation," he said. "More than any other existing group, you hold in your hands the power to promote an invaluable association of all the state officials concerned with the vital problems of vehicle regulation, and to institute a program of study and work which may well mark the beginning of a new epoch of mutual understanding among all our motor vehicle administrators and bring resultant benefit to all those who use our highways."

Strong sentiment for the formation of a national group of motor vehicle administrators has been growing among Eastern Conference members for the past several months. With Mr. MacDonald's specific urge before them, members of the Washington meeting decided to use the opportunity provided by the meeting of the National Safety Conference in Washington, Oct. 3-7, at which about 30 motor vehicle administrators from all sections of the country are expected to be present. Administrators who have already signified their intention of attending the National Safety Conference will be sounded out on the question of an organization meeting for a national group of motor vehicle administrators to be

**Text of Hon. Benjamin G. Eynon's Resolution asking appointment of committee to meet with "representatives of motor vehicle manufacturers":**

"Whereas, The problem of highway traffic accidents is increasingly serious and should have the united attention of all interested agencies, and

"Whereas, The Eastern Conference of Motor Vehicle Administrators is organized for the purpose of attaining uniformity of action between the member states on matters pertaining to legislation and administration of motor vehicle laws, and

"Whereas, This conference has always been effective in such movements, especially as they relate to reciprocal relations between the states:

"Therefore Be It Resolved, That the president of the Eastern Conference of Motor Vehicle Administrators immediately appoint a committee of six members of the conference to meet with the representatives of motor vehicle manufacturers for the purpose of studying the relationship between automobile construction and accidents; to further more complete cooperation between motor vehicle manufacturers and the states; to assure reasonably safe motor vehicles on our streets and highways from the standpoint of essential safety factors; to study the effects of new developments, and to consider the entire question of the motor vehicle industry's responsibility in reducing accident hazards."

held at the same time as the safety conference.

Success of such a national group, it is believed, would depend upon retaining intact the already-existing regional organizations (Eastern, 17 states; Central, 14 states; Pacific, 3 states) but providing a central discussion group before which the common problems affecting all regions could be aired. None of the regional groups have any mandatory powers, and it is unlikely that the national group would be provided with them. Effort to make any proceedings of the Eastern Conference binding upon the individual members would meet with strong resistance, it has been indicated.

Preceding his recommendation for a national group, Mr. MacDonald outlined some of the problems of motor vehicle regulation which particularly call for uniform treatment in the states.

"We should take a long step forward if clear understanding could be reached of exactly what we mean when we say 'truck' or 'bus'; tractor, or trailer, or semi-trailer; single unit, or combination of vehicles. Similarly, we need exact definitions of the terms 'privately owned and operated,' 'common carrier,' 'leased truck' and 'contract carrier.' Likewise, of 'interstate operation' and 'intrastate operation,' of 'resident' and 'non-resident.' Legal decisions will help us here, and the Uniform Code offers an invaluable guide on many of these points. But my point is that there is no real agreement today on many of these commonly-used terms," he said.

Mr. MacDonald pointed out that there is general agreement on a maximum overall width of vehicle, loaded or unloaded, of 96 in. Thirty-nine states

(Turn to page 728, please)

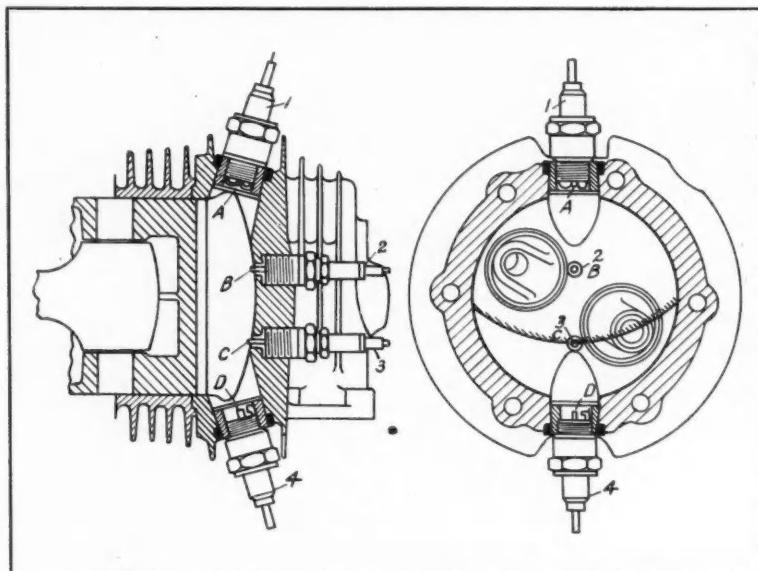


Fig. 1—Combustion chamber of the test engine

1, ignition plug; 2, 3 and 4, spark plugs used to determine the arrival of the flame front at these points; A, point of ignition; B, C and D, measuring points

In a report on Knocking of Engines with Spark Ignition by Kurt Schnauffer, issued by the German Research Institute for Aviation, it is stated that the experiments covered in the report showed definitely for the first time that knocking in such engines is due to the instantaneous combustion of the remaining combustible charge. In the experiments, use was made of an electric indicator capable of tracing diagrams of pressure cycles with very high rates of variation, and of an equipment permitting of determining rates of flame propagation in the cylinder in operation. The latter equipment is based on the phenomenon that a gas-filled gap is ionized by flame, so that if an electromotive force is applied to terminals separated by the gap which is just insufficient to break down the dielectric resistance when the gas is cold, a current will flow as soon as flame appears in the gap. This current controls, through the intermediary of a high-frequency circuit, the oscillograph loop in such a manner that the ionization current produces a deflection of the oscillograph. The moment of arrival of the flame at the gap is therefore definitely recorded in the oscillogram.

It may be mentioned here that this method of measuring rates of flame travel was first applied at the Bureau of Standards in Washington, D. C., by Honaman and MacKenzie about a decade ago. The Bureau of Standards abandoned this method of research, but the German Research Institute for Aviation has used it in recent years not only for measuring rates of flame propagation and investigating phenomena of detonation, but also to determine the influence of mixture ratio, compression ratio and turbulence on these factors.

The research work on detonation was restricted to the determination of pressure variations with respect to time during several cycles, and the tracing of flame

## Confirms Cause

propagation in the cylinder during these cycles by means of the instruments referred to. The project therefore was very similar to that of Lloyd Withrow and T. A. Boyd, whose experiments, conducted in the General Motors research laboratory, were recorded in *Automotive Industries* of July 4 last; except that in the experiments of the latter, flame propagation was recorded photographically, whereas Mr. Schnauffer determined it by measuring the times elapsed between the passage of the ignition spark and the arrival of the flame at a number of other

plugs in the combustion chamber wall to which an electromotive force was applied. As shown in Fig. 1, four spark plugs were used, two in the cylinder head and two in the side walls of the cylinder; and on the oscillograph diagram five curves are traced, the first recording the ignition sparks and the next three the arrival of the flame front at the three other spark plugs respectively, while the fourth is a record of harmonic oscillations of a tuning fork used for time-measuring purposes.

A number of the oscillograms are reproduced herewith. Fig. 2 represents conditions when the engine runs smoothly, that is, without detonation. It will be seen that the flame arrives at the different spark plugs successively, at intervals corresponding substantially to the spacings of the plugs. An analysis of the diagram shows that with an increase in the distance from the source of ignition the rate of flame propagation increases slightly. Fig. 3 is a record from a detonating engine, and it will be seen that the flame reaches points C and D simultaneously.

The author distinguishes between four different types of detonation. First of all there is the usual type of knocking, often referred to as pinging, which is characterized by a certain delay in the combustion, followed by an almost vertical rise of the pressure line. The second form of detonation is due to preignition. If the combustible charge in the cylinder should become ignited by contact with a hot spot in the wall of the combustion chamber ahead of the normal time for ignition, the combined effects of chemical transformation and further compression result in a very steep rise in the pressure line of a pressure-time diagram. But while there is a rapid rise in cylinder pressure, the power output decreases, this being due chiefly to the negative work done in further compressing the

# of Knocking in Spark-Ignition Engines

**German investigator finds that detonation is due to instantaneous combustion of the remaining combustible charge in cylinder. Uses electric indicator for pressure diagrams and traces flame propagation with series of ionized spark gaps at different points in combustion chamber**

burning charge. Owing to the fact that the burning gases in this case are exposed to a large area of combustion-chamber wall, the engine heats up more than normally. The knock is not so "metallic" as that of normal detonation, but more dull.

The third form of detonation may be produced by too high a degree of turbulence in the combustion chamber. This results in a high rate of combustion, but neither is there a delay in combustion nor a very steep pressure rise. The knock is dull and not as sharp as in the case of the ordinary detonation. This form of knocking is experienced especially in the case of turbulence-type heads, and Ricardo has referred to it as roughness and has given a rate of pressure rise of 56 lb. p. sq. in. per degree of crank rotation as the limit below which this type of knock is harmless.

The fourth kind of knock, which is very similar in its characteristics to the last mentioned and differs from it only in its causes, is observed when the engine has knocked severely for a considerable period. The knock then becomes softer and less audible. The rise of the pressure curve is quite steep, but the curve shows no combustion delay and is not vertical. An examination of the oscillograph curves, Fig. 4, shows that the flame travels normally from the point of ignition A by way of B to C, but that, before it reaches C, a second flame approaches it from D. Therefore, before the remaining mixture can be instantaneously ignited from C, it has already burned normally. This may be explained as follows: Owing to detonation, the combustion chamber becomes very hot, but the wall temperature does not rise sufficiently high to produce self-ignition before the regular ignition period. Only after ignition by spark and after the remaining unburned mixture has been further compressed the auto-ignition temperature is reached at certain particularly hot points of the combustion chamber wall. Therefore, starting at one of these hot spots, a flame travels toward the flame initiated by spark ignition. The rate of heat liberation per degree of crank motion increases, but the regular detonation with instantaneous liberation of heat does not occur.

It is pointed out by the author that the method of determining rates of flame travel by means of ionized spark gaps at different points of the combustion chamber wall is adapted to the study of all four forms of detonation.

Following is a summary of the results obtained so far in this investigation:

Figs. 2 and 3—Oscillograms taken to determine the velocity of flame propagation

Fig. 2 represents conditions in an engine operating normally, and Fig. 3, conditions in a detonating engine

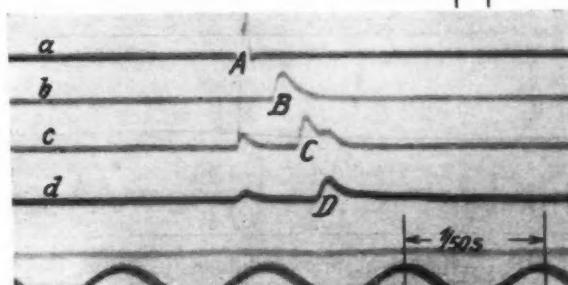


Fig. 3—a, ignition current; b, c and d, ionization currents; A, point of ignition; B, C and D, points of arrival of flame front

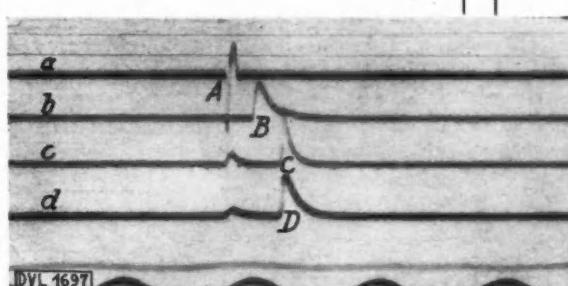
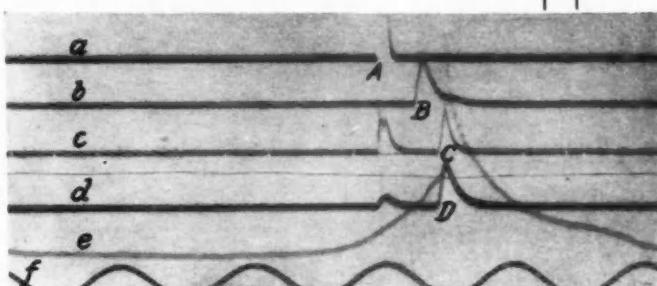


Fig. 4—Oscillogram taken to determine velocity of flame propagation and showing pressure variation with relation to time in a detonating engine

a, ignition current; b, c and d, ionization currents; 2, pressure curve; A, point of ignition; B, C and D, points of arrival of flame front



1. In a spark-ignition engine in ordinary operation combustion takes place in such a manner that the flame, starting from the point of ignition, travels through the combustion chamber with a substantially constant velocity.

2. When the engine detonates, that portion of the charge not yet burned, upon reaching the auto-ignition temperature, is burned all at once.

3. Instantaneous ignition of a considerable portion of the charge with direct energy conversion, results in great pressure and temperature increases.

4. Energy transformation occurs so directly, and therefore at such a high rate, that important local pressure differences occur, which equalize themselves at the velocity of sound.

5. Under conditions of normal combustion, owing to the low rate of flame propagation of about 80 ft. p. sec., the pressure is always the same throughout the combustion chamber.

6. The intensity of the knock depends upon the proportion of the charge still unburned when detonation sets in, and upon its composition (mixture ratio).

7. As a measure of the intensity of the knock it is possible to use either the pressure rise measured directly at the center of detonation, or the amount of charge which is ignited simultaneously, taking account of its composition.

8. Owing to the great local pressure differences in the combustion chamber during detonation, it is not inconsequential at what point of the combustion chamber the pressure is measured. The pressure must be measured at the center of detonation. (In the case of comparative motor tests to determine the anti-knock qualities of different fuels this point should receive special attention, if equal results are desired from different test engines.)

9. In addition to the principal detonation there are three other forms, which can be readily distinguished by taking records of pressure variation.

10. When there is detonation, the ionization currents increase, owing to the increased temperature. The increase in the intensity of the currents may amount to several hundred per cent.

11. In normal operation there is extensive after-burning (up to the time the exhaust valve begins to open, as is proven by the exhaust flame). In the case of detonating combustion, combustion takes place so rapidly and so completely that after-burning is eliminated and the exhaust flame is missing.

12. If the proportion of the charge which is ignited simultaneously is very large, owing to the heat expansion of the gases thus ignited, there occurs a very pronounced negative flame-front velocity it was observed.

## Flexible City-Type Motor Coaches

THE Fxible Company, Loudonville, Ohio, has placed on the market three city-type coaches for 17, 21 and 25 passengers respectively. These are equipped with Buick-type engines developing a torque of 261 lb.-ft. at 1400 r.p.m. and a maximum horsepower of 113. With the 21-passenger unit a wheelbase of 201 in. is used. The frames are of pressed steel of 9 by 3 by  $\frac{1}{4}$ -in. section, and have ten heavy cross-members each. Outriggers to carry the body are fastened to the side rails in line with the cross-members. The tops of all outriggers are on the same level, thus permitting the floor of the coach to be level. The frame rear kick-up, necessary for a low center of gravity, is maintained

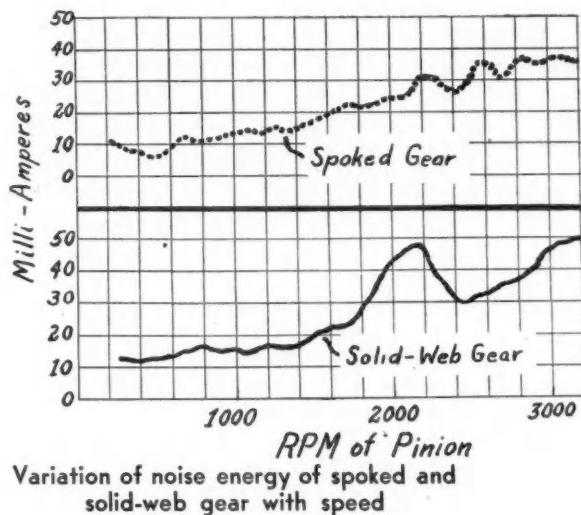
with this construction, as this part of the frame comes inside the wheel housing, where it does not interfere with the floor.

The rear axle is of the Timken full-floating type, with spiral bevel-gear drive. Gear ratios are made to suit the operating conditions. The coach bodies are of hard wood and the outside is covered with 20-gage sheet steel. Before paneling, all wooden parts are treated with a preservative. The metal panels are treated on the inside to prevent rust from forming, particularly where the panels are joined to the pillar posts. The headroom is made 70, 72 or 74 in., as desired. All seats are upholstered in genuine leather.



Fxible Buick-powered city-type coach

# Celoron Develops Spoke-Type Gear To Reduce Noise and Temperature



Variation of noise energy of spoked and solid-web gear with speed

**A**SPOKED type of gear of phenolic material (Celoron) has been developed for camshaft drives by the Continental Diamond Fibre Company of Newark, Del., and Bridgeport, Pa., and has been subjected to extensive tests in the engines of a number of different makes of passenger cars.

Heretofore all camshaft gears of phenolic materials have been made with solid webs, and the spoked gear is claimed to possess advantages from the standpoints of quietness, low operating temperature, and reduced wear, the reduction in wear being due largely to the lower temperature. Extensive comparative tests of solid-web and spoked gears have been carried out at the Bridgeport laboratory of the company, and the results bear out the claims made for the spoked gear. Tests also show that the spoked gear compares favorably with the solid-web type with respect to lateral rigidity.

The illustration reproduced herewith shows a five-spoke design. Four-spoked wheels are also being made. Various designs were evolved and tried out with respect to silence of operation, lateral rigidity, and temperature rise, and the design of spoke that gave optimum results was finally adopted for regular production.

## Microphone Measures Noise

In measuring the noise of gears in operation, the Continental Diamond Fibre Company's Bridgeport laboratory uses an electrical apparatus. The pair to be tested (a steel pinion and non-metallic gear) are incorporated in the drive between an electric motor and a direct-current generator, the gears being inclosed in a wooden box lined with sound-absorbing material. Within the box is placed a sound pick-up device or microphone, which converts the sound energy impinging on its diaphragm into electrical energy. The elec-

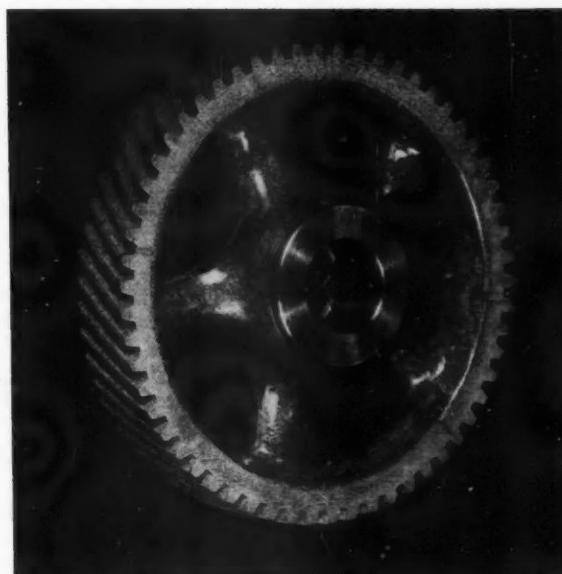
tric current is conducted to an amplifier, where it is multiplied or transformed, and the output current of the amplifier is measured by means of a milli-ammeter. The readings of the milli-ammeter are direct indications of the volume of sound given out by the gears.

## Spoke Type is Quieter

In a comparative test of a solid-web and a spoked gear, both designed for use on the same engine, these gears were successively mounted in the dynamometer, to run together with the same steel crankshaft pinion. Center distances were adjusted so as to give a backlash of 0.003 in. The gears were run dry (without lubricant) at a constant pinion speed of 1800 r.p.m., first without load and then under loads of 10 and 20 amp. (at 230 volts). Three "noise" readings were taken at each load for each type of gear. The averages of the three readings under each of the three loads on the two types of gears were as follows:

Load	0	10 amp.	20 amp.
Solid-web gear	37.8 m-amp.	37 m-amp.	39 m-amp.
Spoked gear	14.3 m-amp.	12.25 m-amp.	13.25 m-amp.

It will be noticed that with both gears there is comparatively little change in the volume of sound with change in load, but it is interesting to note that whereas in the case of the solid-web gear the volume of sound increases with the load, in the spoked gear it decreases as the load increases. That the volume of sound emitted by the spoked gear is only about one-third as great as that from the solid-web gear is believed to be due to the fact that the solid-web has something of a



Five-spoked Celoron camshaft gear

Static Lateral Deflection Test (inches)	Load (lb.)	Std. Prod. Gear	Heavy-Web Gear	Spoked Gear
	100	0.003	0.001	0.000
	200	0.003	0.001	0.0025
	300	0.005	0.003	0.004
	400	0.007	0.004	0.006
	500	0.009	0.005	0.008
	600	0.011	0.0055	0.010
	700	0.012	0.006	0.012
	800	0.013	0.007	0.0135
	900	0.0145	0.008	0.016
	1000	0.016	0.008	0.0175
	1100	0.017	0.009	0.019
	1200	0.0185	0.0095	0.021
	1300	0.020	0.010	0.023
	1400	0.0215	0.0105	0.025
	1500	0.023	0.0115	0.027

sounding-board effect which is missing in the spoked gear.

### Noise Energy Compared

The diagram on page 723 shows increase in noise from gears with increase in speed. It will be noticed that in the case of the spoked gear the volume increases rather uniformly with the speed, whereas with the solid-web gear there is a pronounced peak in the curve of noise volume at about 2200 r.p.m. of the crankshaft. The reason for the increase in noise at this speed is probably a torsional vibration period of the crankshaft, and that there is no increase in noise at this speed with the spoked gear seems to indicate that the latter has greater damping capacity. The peak in the noise curve of the solid-web gear disappeared, however, after the gear had been operated in an engine for about 100 hours.

Elasticity is one of the principal advantages of phenolic materials when considered for use in gears, as it enables the teeth to absorb shocks which would produce great stresses in teeth of a more rigid material, and it also is largely responsible for the silent operation of the gears. There is, however, a limit to the elastic deflection that can be allowed in camshaft-drive gears, and as the webbed gears were designed to take full advantage of the permissible latitude in this respect, it is desirable that the spoked gears show the same degree of rigidity as the solid-web gears. The following table gives the results of static deflection tests made on three designs of gears, the first the standard solid-web gear, the second a solid-web gear with extra heavy web, and the third the spoked gear. In making this test, the gear is supported by its rim on a rigid base, pressure is applied to the hub in the direction of the gear axis, and deflections of the hub relative to the rim for various pressures are measured.

It is stated that the normal thrust load on this gear (due to the helix angle of the teeth) is only 400 lb. The breaking loads on two spoked gears were found to be 3050 and 3185 lb. respectively, so these gears work with a safety factor of nearly 8.

Tests of lateral deflection under dynamic load were also made and confirmed the conclusion drawn from the above results that the spoked gear has about the

same lateral rigidity as the standard production solid-web gear.

The rise in temperature of the gears in service is of considerable importance, because the hardness of the material decreases as the temperature increases, and the wear resistance therefore is greatest at low temperatures. To determine the effects of different designs on the temperatures reached in service, comparative tests were made on four different types, viz., a standard-production solid-web gear; a solid-web steel-center gear, a gear with steel web to which the rim is molded, and the spoked gear with steel center.

### Less Heat is Found

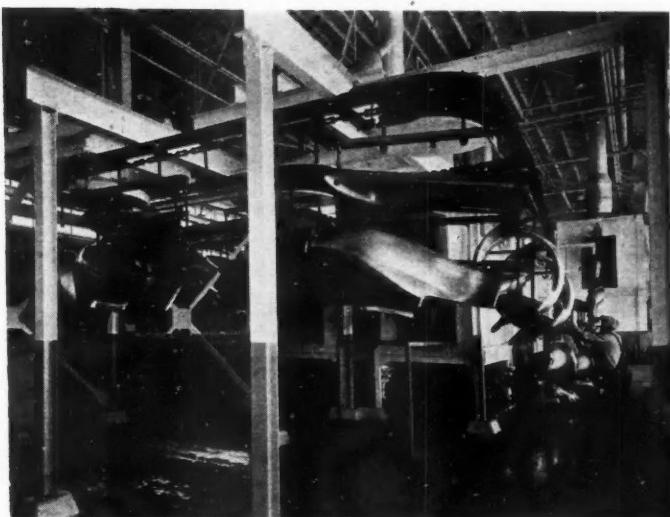
The temperatures of both the non-metallic gear and the steel pinion in the dynamometer were measured at the beginning of the test. The sound-proof box over the gears was then closed and the dynamometer was run for 15 minutes with a load of 20 amp. at 230 volts. Temperatures of both gear and pinion were then measured again. The results for all four combinations are given in the following table:

### Temperature Rise During 15 Minutes' Run Under 20 Amp. Load

	At Beginning of Run		At End of Run	
	Celoron Deg. Fahr.	Steel Deg. Fahr.	Celoron Deg. Fahr.	Steel Deg. Fahr.
Standard-production solid-web	75	90	102	208
Solid-web, steel-center .....	73	105	80	122
Steel-web gear .....	73	100	80	135
Spoked gear with steel center ..	70	105	83	126

Actual service tests extending over 54,000 miles of car operation are said to have shown a reduction in wear of 50 per cent.

A spoked gear of the same outside diameter and width of face, and therefore capable of transmitting the same load, is lighter than a solid-web gear, and though the difference is small, it is entirely in favor of the spoked gear, since it eliminates that much weight from the car.



Conveyor installed in Ford plant at Long Beach, Calif.

### Bicentennial Colors

Fashion, style, color, sell cars. So much so that Mimax and Ditzlac offer a range of new hues reflecting the "Spirit of '76." Thus styling the new car for the George Washington Bicentennial year. Autocolor for spring and summer (published Pittsburgh Plate Glass) features 13 characteristic color cards. "Dolly Madison," "George Washington Blue," "Thomas Jefferson Brown," will give you the general idea.

### Under the Skin

Lots of thought being given these days to the simplification of body finishes. People are wondering why put on coat after coat of surfacers and whatnot only to rub them off. What is the possibility of fewer coats—but leaving them on? Those in the know think it will be done.

### Anything New?

We have a story on the way concerning a new idea in alkaline cleaning of metal parts. The general idea is to make a bath comprising independent alkali and emulsifying agents. Then a method of control. If the bath becomes deficient in alkali or soap you add the right ingredient and a little gadget tells you how much. What do you think of it?

### Stainless History

According to a newspaper dispatch, the real story of the discovery of stainless steel is not to be told for another three decades. Harry Brearley, said to be the discoverer

of the metal, gave the Cutlers Society of Sheffield a sealed envelope with instructions not to open it until the cutlers feast of 1960. The envelope contains the inside stuff.

### Add to Synthetics

If you will get a copy of Sherwin-Williams' booklet on Kemfinishes you can add another chapter to the article on synthetic resin finishes which appeared in *Automotive Industries*, Dec. 19, 1931. Specific information on baking and air-drying enamels is given in very interesting fashion.

### Cosmic Balance-Wheel

Can society be stabilized by introducing elastic compensating mechanisms to absorb the shocks of business and scientific progress? Dean Donham, author of "Business Adrift," says it can be done, and shows how in a new book, "Business Looks at the Unforeseen." It has too much meat to be reviewed even inadequately. You'll miss one of the most brilliant studies of today's economic problems if you don't read it.

\* \* \*

The present work offers a theory of adjustment. Business is likened to living organism. Nature wisely provides: permanent adaptation to persistent changes; insulation and defense mechanism; compensating mechanism and margins of safety. Society can do the same.

\* \* \*

A good analogy is the modern motor car. The engine has tremendous excess power. To accelerate—to climb an unexpected grade, the operator merely steps on the gas.

# PRODUCTION LINES

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The engine does the rest without grumbling because it has *flexibility* and a margin of safety.

\* \* \*

Society needs a Central Thinking Agency. Its functions would be to study long-time trends, chart business conditions, develop compensating mechanisms — *anticipate* changes. It should be composed of representatives of — government, business, labor. It should NOT have control.

\* \* \*

The need for a flexible credit system; maintenance of standards of living; high price levels; the export situation — these are all examined and dusted off. Finally is a criticism of the important emergency plans which have been proposed recently.

\* \* \*

It's a book you'll have to read. (Whittlesey House, publishers.)

### Old Turnings

It seems that the late H. M. Leland received his early training with Brown and Beale of machine tool fame. And at the time they were concentrating on questions of gaging and mechanical accuracy. In 1910, some time after developing the Cadillac, Mr. Leland gave a remarkable demonstration in London. He disassembled three Cadillacs, mixed the parts, and reassembled the cars from random parts. Thus proving interchangeability in fact as well as theory.

—J.G.



# Oven-Length Controls Finishing-Time

**Problem of locating two or more ovens on same conveyor line, which operates at uniform speed, settled satisfactorily in Long Beach operations, using gas heat for baking and drying of finishing materials**

by  
**J. B. Nealey**  
 American Gas Association

**G**AS HEAT is used in baking enamel on various automobile parts while steam coils from gas-fired boilers dry several coats of paint on bodies, at the recently completed assembly plant of the Ford Motor Co., Long Beach, Calif.

The wheel oven is of sheet steel construction and is heated with hot air blown into it from separate, gas-fired heaters, which are located on top and at one end. This oven is approximately 60 ft. long and completely encloses a motor-driven conveyor operating at a speed of 8 in. per min. One end of the oven is open. Wheels are loaded on and removed from the conveyor at this point. Close by are two mechanical units for black-enameling the wheels. The wheels are placed in these, one at a time, where they are automatically lowered for immersion, raised and then rapidly rotated to throw off the surplus enamel. Operators then transfer them to the oven conveyor. It requires 1 hr., 20 min. for them to make the round trip in the oven, when carried at 375 deg. Fahr. An overhead traveling chain conveyor 660 ft. long, adjacent to the oven is used for cooling. Finally the tires are mounted on the rims and conveyed to the final assembly line. Wheels to be colored are sprayed and sent through one of the other ovens.

The heater, as stated, is located on top of the oven and consists of a sheet steel casing enclosing a com-

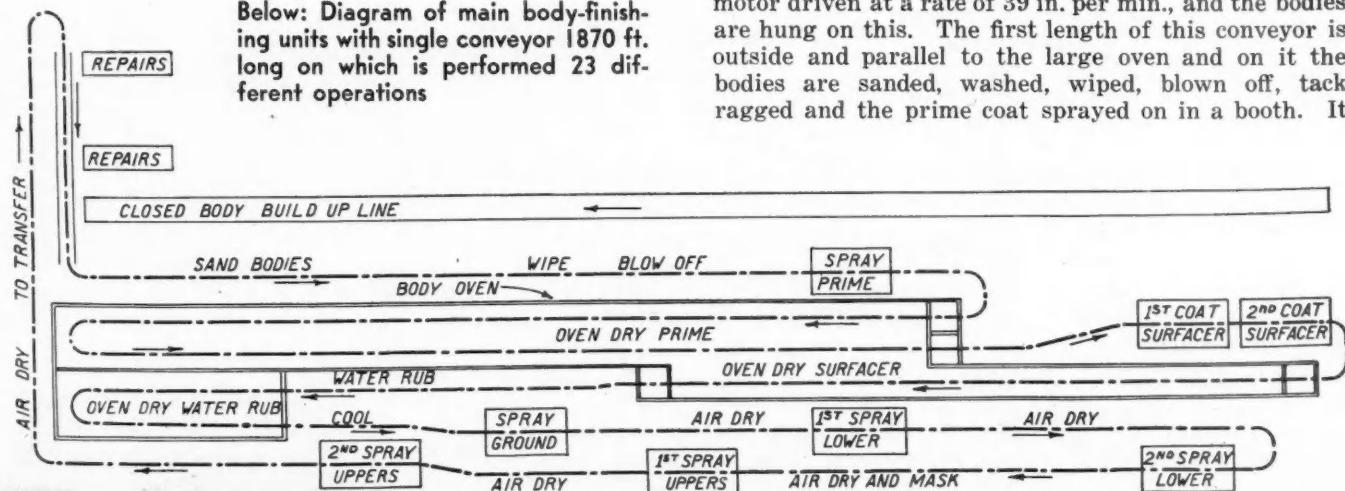
bustion chamber, lined with refractory tile, and banks of heating elements. Each heating element consists of a large number of interlocked, special-shape tubes made from pressed steel. The gas burners are of the atmospheric tile type operating on pressures of 12 to 15 in. water gage.

Enough draft is supplied by the fan driving the fresh air into the heater to force it past the tubes, where it is heated, and into the oven through ducts. An induced draft fan, located on top and at the opposite end of the oven, draws the hot air through the oven and vents it through stacks. A hood partially covers the end of the oven where the operators load and unload and another induced-draft fan pulls up and vents what heat might otherwise escape through the opening.

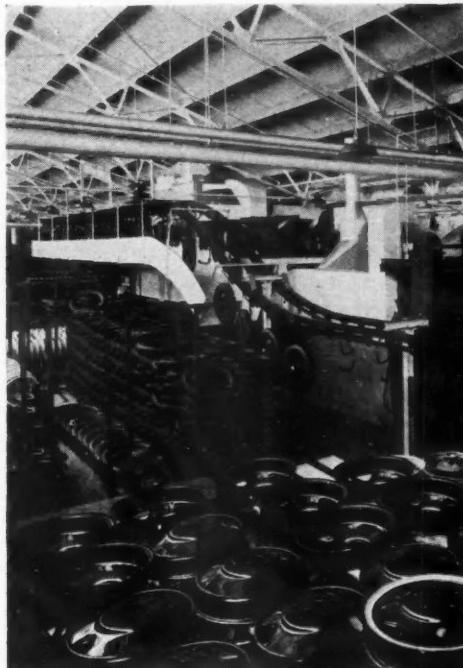
The feature of the body-painting division is a conveyor that winds back and forth on itself, through spray booths and drying ovens, six times and has a total length of 1870 ft. The principal oven is 437 ft. long and just wide enough for the conveyor to travel the length of it and return (two passes) except for the second portion for drying surfacer which will accommodate another pass of the conveyor and extends somewhat beyond. At the other end of this oven, and built against it so that the conveyor passes into it without changing direction, is another oven 87½ ft. long. Scattered along this conveyor are eight spray booths for eight different coats, and those coats not dried in these two ovens are air dried.

The conveyor is of the overhead chain-and-hook type, motor driven at a rate of 39 in. per min., and the bodies are hung on this. The first length of this conveyor is outside and parallel to the large oven and on it the bodies are sanded, washed, wiped, blown off, tack ragged and the prime coat sprayed on in a booth. It

Below: Diagram of main body-finishing units with single conveyor 1870 ft. long on which is performed 23 different operations



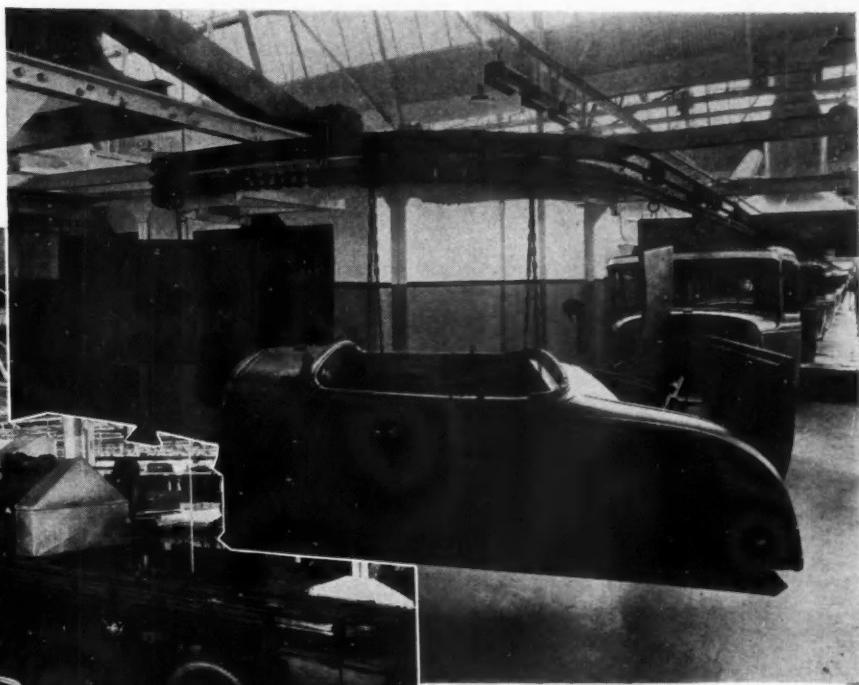
# in Ford Plant



Wheel oven which is loaded and unloaded at one end only, with mechanical units for immersing wheels in enamel and then whirling them to remove surplus enamel. Note chain conveyors for cooling wheels and moving stock

then turns on itself and passes through the oven and returns for drying, the time being 150 min. and the temperature 225 deg. Fahr. Passing through two booths in succession the bodies next receive the first coat surfacer and the second coat surfacer which are dried on as the conveyor passes through the enlarged section of the oven. This requires 30 min. at 250 deg. Fahr. The length of conveyor exposed between the discharge end of this wider section of the oven and the entering end of the 87½ ft. drying oven is used to give the work a water rub, and drying is accomplished at 175 deg. Fahr. in 27 in.

The conveyor makes a complete turn at the end of this small oven and returns parallel to the long oven where the bodies are cooled and pass through two spray booths in which they receive the ground coat and the first lower spray respectively. Turning on itself for the sixth pass the bodies go through three booths, receiving progressively the second spray lower, first spray upper and second spray upper, these coats being air dried on the exposed portions of the conveyor in between. The booths are of glass, open at both ends for the passage of the conveyor and work, and hooded with fans to draw out the fumes. This layout will paint and dry 145 bodies every 8 hr. This oven, as well as the other paint-drying ovens in this division, is heated with steam coils from gas-fired steam boilers.



Steam-heated paint oven showing south and east side

The fender enamel and oils are delivered at room temperature from the storage vats, by a battery of steam pumps, to their respective places of utilization in the plant. The body lacquers are mixed in steam-driven mixing tanks, from which they are pumped to spray booths.

It requires more than 36,000 ft. of pipe to make these deliveries. Fender enamel and oils of the larger consumption items are stored in six steel tanks with a combined capacity for 148,000 gal. and these are enclosed in a concrete pit which is partly below water level.

At the end of the sixth pass the conveyor turns and runs at right angles to its former direction, for 167 ft., and returns to the point of beginning. This added space is used to transfer the bodies onto a series of slat type conveyors where they are trimmed and the solvent is sprayed and dried off, polish is given, etc. When finished they are stored on 14 slat type conveyors, each 110 ft. long, of which half are located on a platform over the others. These conveyors operate at a speed of 75 ft. per min., and will hold 11 bodies each, or a total of 154. They are held here until discharged onto the final assembly line.

The solvent is dried off in an oven heated with steam coils from the gas-fired boilers. This oven is 62 ft. long, and is carried at a temperature of 125 deg. Fahr. while the drying period is 14 min. These ovens are all built of sheet steel with rockwool and asbestos insulation. It will be noticed that when two or more ovens are located over the same conveyor, which operates at one speed, the different time periods necessary for drying various coats of paint, are regulated by the lengths of the ovens.

## Administrators Ask Less Talk of Speed in Advertisements

(Continued from page 719)

already fix the width limit at this figure, which indicates that there will be little dispute on this point. He said it seemed desirable to grant some form of special permission to cover a changeover from solid tires to pneumatics, or from single wheels to dual wheels, which would necessitate an allowance possibly of not more than 102 in. when measured from outside to outside of dual pneumatic tires.

"Minimum maximum" height, he suggested, should be 12 ft., made necessary by the clearance limits of many bridges and underpasses, and other overhead structures. This is the limit recommended in the Uniform Code, and it has been adopted in eight states.

"I believe," he said, "that the length of a single vehicle should not exceed 35 ft. The limit fixed by the Uniform Motor Vehicle Code is 33 ft. There are certain advantages to the motor industry in the additional 2 ft., and it is my judgment that highway officials will not object to the 35-ft. standard.

The length recommended by the Joint Highway Transport Committee for a combination of vehicles is 65 ft., and this adjustment was apparently arrived at with the expectation that a trailer would appear in the combination. The Uniform Motor Vehicle Code recommends 85 ft., and many states have reduced the length to a variety of figures running as low as 40 ft., indicating a diversity of opinion.

An adjustment of an important definition may help us to a decision regarding this question. If a tractor with semi-trailer is to be considered as a single unit and trailers are to be permitted, 65 ft. is undoubtedly the necessary length for an economical combination of vehicles. If, however, a tractor with semi-trailer is itself to be considered a combination of vehicles, 65 ft. is then an excessive and probably dangerous length to permit, and we should

be justified in reducing the length in a combination of vehicles to 50 ft. This would permit the use of a tractor and semi-trailer or of a truck and trailer.

If we hereafter limit truck and bus traffic to the use of high-pressure pneumatic tires, an axle load of 16,000 lb. is satisfactory both to the motor vehicle industry and to the highway builder. If balloon tires are used, 18,000 lb. per axle may be allowed.

The use of the pneumatic tire must, however, be emphasized in this connection, and I feel from the very definite results of tests made by bureau engineers that regulating authorities would be fully justified if solid tires were entirely ruled off the public highways except only under special permit to meet a few strictly localized conditions as, for instance, in municipalities, that would in no wise have a general effect on motor transport operations."

The Eastern Conference of Motor Vehicle Administrators, which meets semi-annually, is headed by George R. Wellington, chief clerk, motor vehicle department, Providence, R. I., as president, Harold G. Hoffman, commissioner of motor vehicles of New Jersey, is secretary. Other members of the conference attending were: Hon. Robbins B. Stoeckel, commissioner of motor vehicles, Hartford, Conn.; W. A. Van Duzer, director of traffic, Washington, D. C.; Col. E. Austin Baughman, commissioner of motor vehicles, Baltimore, Md.; Morgan T. Ryan, registrar of motor vehicles, Boston, Mass.; Orville E. Atwood, chief of motor vehicle division, Lansing, Mich.; Hon. John F. Griffin, commissioner of motor vehicles, Concord, N. H.; J. P. Bickell, registrar of motor vehicles, Toronto, Ont.; Hon. Benjamin G. Eynon, commissioner of motor vehicles, Harrisburg, Pa.; Charles M. McCabe, commissioner of finance and taxation, Nashville, Tenn.; Hon. Charles T. Pierce, commissioner of motor vehicles, Montpelier, Vt., and Mr. Stevens, Iowa.

## Water Injection in Cylinders of Internal Combustion Engines

M. M. CLAYTON, an instructor at Oregon State Agricultural College, has developed a system of injecting water into the cylinders of an internal-combustion engine, which he claims enables him to get substantially twice the thermal efficiency of the ordinary engine. On theoretical grounds one would expect a loss of thermal efficiency rather than a gain, for the reason that any water injected, upon its vaporization, will immediately abstract from the hot gases heat at the rate of 962 B.t.u. per pound of water, and this heat is irretrievably lost, since the steam cannot possibly be condensed in the cylinder. This heat, of course, would have to come from the burning gases, whose capacity for doing mechanical work would be thus reduced. Professor Clayton, however, says his tests have shown him a thermal efficiency of 40 per cent, fuel consumption as low as 0.31 lb. per hp.-hr., and a car mileage increased from 19-20 to 40-45 per gallon. If Professor Clayton can substantiate his claims it would naturally be a wonderful thing for our national economy, as the annual motor fuel bill of the nation could be

cut in half; but in view of the fact that water "induction" has been widely practiced in the past to prevent detonation in kerosene-burning engines and for other purposes, without any material gain in fuel economy having been demonstrated, he must expect to meet with a good deal of skepticism.—P. M. H.

AT a recent meeting of the Diesel Engine Users' Association in England, Charles Day of the Mirrlees-Watson Co. gave some information bearing on the life of Diesel engines. When he joined the firm after it had secured the Diesel patents, he found that the original engine built had been put aside as unsatisfactory. The firm then designed and built two other engines and decided to run them themselves for 12 months before proceeding with manufacturing operations; they also rebuilt the original engine. Mr. Day said that all three engines were working satisfactorily today, after 34 years. Their fuel consumption was the same as when the engines were new and was within 10 per cent of that obtained with present-day engines.

# Supercharged Duesenberg Shows 20% Power Increase

Size of clutch and transmission bearing enlarged to handle additional power in standard chassis

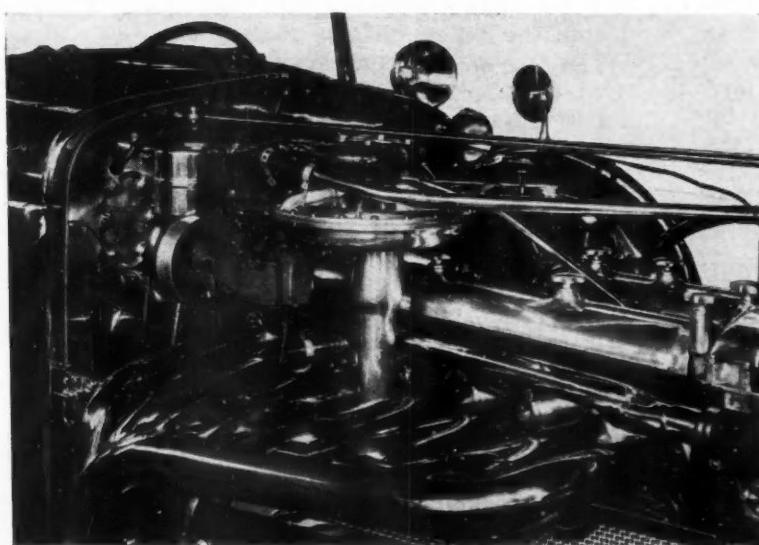
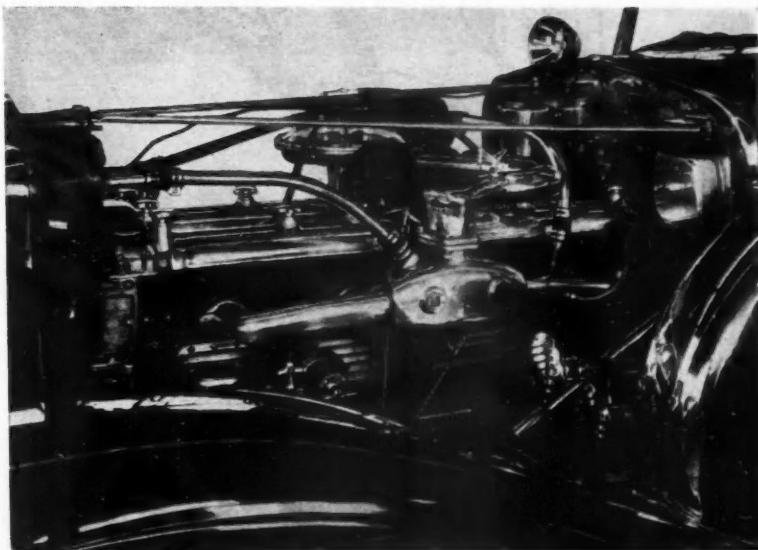
**A**SUPERCHARGED model, increasing the horsepower about 20 per cent as compared with the regular model has been announced by Duesenberg, Inc., Indianapolis, Ind. The chassis is the same as that of the regular model except for increases in the size of the clutch and of bearings in the transmission to take care of the additional power developed. Aside from the supercharger and its appurtenances the engine also is of the same design as that of the standard Duesenberg model.

The engine is an eight-cylinder  $3\frac{3}{4}$  by  $4\frac{3}{4}$  in. and with the aid of the supercharger it develops 320 hp. The supercharger is of the centrifugal type and is mounted on the right side of the engine (the exhaust side) on a vertical axis, being located slightly above the cylinder head at the center of the engine. Drive of the supercharger is from the accessories driveshaft on the right-hand side through a vertical driveshaft.

The unit is 12 in. in diameter and is geared to run at six times crankshaft speed. At an engine speed of 4000 r.p.m. it maintains a pressure of approximately 8 lb. p. sq. in. above atmospheric in the inlet manifold. In the information furnished us it is not stated whether the rated horsepower of 320 is developed at this speed, but assuming this to be the case, the b.m.e.p. at maximum output figures out to 151 lb. p. sq. in.

The supercharger is in constant operation and is said to be noiseless. The intake manifold as well as the entrance from the carburetor to the supercharger is water-jacketed, the hot water entering the jacket from the radiator of the car and passing from it to the cylinder block.

It is stated that this chassis fitted with a convertible coupe body will accelerate from standing start to 100 m.p.h. in less than 17 seconds, and that the same car was recently driven at 104 m.p.h. in second gear. This model is equipped with chromium-plated exhaust pipes that extend out through the hood and allow of the installation of a muffler cut-out directly below the right-side fender. Hood louvers are dispensed with and chromium-plated screen grids are used in their place.



Inlet side of Duesenberg supercharged powerplant showing the jacket on the inlet manifold

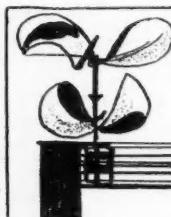
These add considerably to the appearance of the car and distinguish it from the standard Duesenberg.

The supercharged Duesenberg is claimed to be the most powerful and fastest automobile manufactured in the United States, and the belief is expressed that it is the fastest stock car manufactured anywhere.

The new supercharged Duesenberg has the supercharger mounted high up on the side of the engine on a vertical axis

# Automotive Oddities—By Pete Keenan

**ARTHUR DANDURAND**  
OF CANADA, 53  
YEARS OLD, CAN  
SHOULDER A 406 lb.  
AUTO ENGINE.

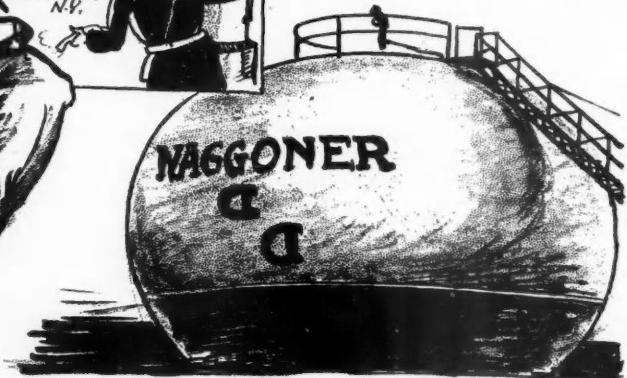


**ALADDIN'S MAGIC COTTAGE.** AN ARTIST'S IDEA OF AN EARLY ATTEMPT TO FLY THE ATLANTIC 50 YEARS AGO.

POLICE RAIDED THE  
FILLING STATION OF  
W.B. MOONAN. TURNED  
THE CRANK, AND OUT  
GUSHED A  
STREAM OF  
WHISKY.  
BORDERTOWN,  
N.Y.



**UNUSUAL GAS TANK AT**  
ELECTRA, TEX. ONE OF IT'S  
FEATURES IS THE REDUCTION  
OF LOSS BY EVAPORATION.



Write us if you know an "Oddity"

## The NEWS TRAILER

While Mrs. Henry Ford, who is president of the National Farm and Garden Association, was in New Brunswick, N. J. at a council meeting of the Association, and iterating her interest in the small farm and the welfare of its women, the Ford Motor Co. offered 62 acres of Dearborn land for thrift gardens, and the Buick Motor Car Co. was setting aside 7 acres of Flint land for division into 120 plots for present workers and those recently released."

Louis Schneider, last year's ranking racing driver, and winner at Indianapolis, has requested the AAA contest board to allow him the use of No. 13 on the car he will drive this year at Indianapolis. The last guy who started under a "13" was forced out of the big race after 50 miles, according to Steve Hannagan, who should know.

Tourists entering Canada in 1931 spent \$29,000,000 less than they did in 1930. Tourists entering Canada in 1931 probably had \$29,000,000 less to spend.

Byron Foy is beginning his second year as president of the DeSoto division of Chrysler.

The Metropolitan Life Insurance Co. and Robbins B. Stoeckel, commissioner of motor vehicles of Connecticut, were of one mind last week, at least so far as the question of driving motor vehicles is concerned. Mr. Stoeckel published a booklet on "The Cardinal Rules of Good Driving," and Metlife issued a booklet with the title "Encourage Good Driving in Your Community," which outlines a community safety program and offers exhibit material to help along.

Kosciusko county, Indiana, learned, while making its personal property assessment, that there was an automobile, passenger car or truck in every back yard in the county. J. H. Flieschman of Eaton Rapids, Michigan, removed his own tonsils while fixing a tire. The tire exploded and a tool struck a pipe. Flieschman was smoking, forcing the stem into his throat and lopping off his tonsils as clean as a whistle.

# NEWS

## No Action On Price Advertising

N.A.C.C. Sales Managers Revive Service Activity at Detroit Meeting

DETROIT, May 10—Service activities of the N.A.C.C. were revived here today with the organization of a service managers sub-committee to the sales managers committee of the Chamber. J. F. Kenyon of Chrysler Motors Parts was elected chairman, and T. H. Stambaugh of General Motors Corp., secretary. The committee is to develop recommendations for consideration at a future meeting by the distribution heads of car and truck companies. No action was taken at the meeting on the question of advertising delivered prices.

In attendance were: R. H. Grant (General Motors), chairman; Jos. E. Fields (Chrysler); Paul G. Hoffman (Studebaker); H. B. Harper (Willys-Overland); C. B. Abbott (Hudson); C. H. Bliss (Nash); H. W. Peters (Packard); I. N. Kauffelt (Hupp); Elijah G. Poxson (Reo); W. O. Lampe (Graham-Paige); B. E. Hutchinson, treasurer of Chrysler, who represented Plymouth; B. G. Koether and S. N. DuBrul (General Motors); and Alfred Reeves, vice-president, National Automobile Chamber of Commerce.

Service managers present included representatives of General Motors, Chrysler, Buick-Olds-Pontiac, Hudson, Graham, United Motors Service, Nash, Chevrolet, Hupmobile, Cadillac, General Motors Truck, Studebaker, Reo and Packard.

### Detroit Section Installs Officers

DETROIT, May 10—At the final meeting of the season of the Detroit Section, Society of Automotive Engineers, last evening, officers for the coming year were installed.

These are: E. V. Rippingille, chairman; John Votyka, vice-chairman in charge of the body division; George Allen, vice-chairman in charge

of the passenger car division; Ralph DuBois, vice-chairman in charge of aeronautics; H. T. Woolson, vice-chairman in charge of student activity, and Vincent Rumley, secretary for all activities.

Charles F. Kettering, vice-president, General Motors Corp., was the principal speaker at the meeting.

### Administrators Name Conference Committee

PROVIDENCE, R. I., May 11—George R. Wellington, president of the Eastern Conference of Motor Vehicle Administrators, announced today appointment of a Conference committee to meet with representatives of motor vehicle manufacturers. Appointment of the committee was in accordance with a resolution adopted at a meeting of the Conference in Washington, May 5 and 6 (reported on pages 718-719, this issue of *Automotive Industries*). Members of the committee, in addition to Mr. Wellington, who serves ex officio on all Conference committees, are as follows:

Robbins B. Stoeckel, Connecticut, Chairman  
Benjamin G. Eynon, Pennsylvania  
Harold G. Hoffman, New Jersey  
Charles M. McCabe, Tennessee  
J. P. Bickell, Ontario, Can.  
W. A. VanDuzer, District of Columbia

Committed procedure for contacting motor vehicle manufacturers will rest with Commissioner Stoeckel, Connecticut, chairman.

### April Output 146,584 Units

April production of motor vehicles in the United States amounted to 146,584 units, according to the preliminary estimate released by the National Automobile Chamber of Commerce. This was an increase of 15 per cent over the output for the preceding month, and 58 per cent under April, 1931.

According to this estimate, motor production for the year to date is 51 per cent under 1931. The Chamber's figures are based on reports of factory shipments.

TO MEMBERS OF THE NATIONAL AUTOMOBILE CHAMBER OF COMMERCE WE REPORT WITH SORROW THE DEATH OF ONE OF THE INDUSTRY'S MOST FAITHFUL SERVANTS AND BELOVED FRIEND

Samuel Arthur Miles

WHO WAS STRICKEN ON APRIL 29, 1932, WHILE ON A VISIT TO HIS BIRTHPLACE AT BRISTOL, ENGLAND.

SO PASSED AN OUTSTANDING FIGURE OF THE MOTOR INDUSTRY — ONE WHOSE GENIAL CHARACTER HAD ESTABLISHED AND MAINTAINED COUNTLESS FRIENDS THROUGH HIS THIRTY-TWO YEARS OF AUTOMOBILE SHOW MANAGEMENT.

HIS DEVOTION TO THE INDUSTRY HAS EARNED FOR HIM THE RESPECT, AFFECTION, THE DEEPEST RESPECT AND THE LASTING AFFECTION OF ITS LEADERS.

HIS WAS A LIFE UNSELFISHLY DEVOTED TO THE SERVICE AND LOVE OF HIS FELLOW-MAN. A MAN OF KEEN BUSINESS JUDGMENT — RUGGED — CAPABLE — PLAIN SPEAKING. HIS UNWAVERING LOYALTY; HIS UNOBTRUSIVE GENEROSITY; HIS UNSWAYING INTEGRITY; HIS DAUNTLESS COURAGE AND HIS UNFAILING CHEERFULNESS ARE RECORDED INDELIBLY IN OUR MEMORY.

TO MRS. MILES AND OTHER MEMBERS OF HIS FAMILY WE RECORD OUR HEARTFELT SYMPATHY IN HER GREAT LOSS.

OUR SORROW IS SHARED BY UNNUMBERED FRIENDS OUTSIDE THE INDUSTRY.

NO FINER TRIBUTE COULD STAND IN HIS HONOR THAN THE AFFECTIONATE MEMORY HELD BY HUNDREDS OF LITTLE CHILDREN WHOM HE CARED FOR AT THE SPECIAL CAMP ON HIS HOME ESTATE, FOR THEIR "UNCLE SAM OF CHRISTMAS."

TIME WILL NOT DIM OUR MEMORY OF THE NOBLE CHARACTER EXEMPLIFIED DURING HIS LIFE TIME.

CHARLES W. NASH, SECRETARY. ALVIN MACMULLEY, PRESIDENT.

APRIL 28, 1932

Memorial services for the late Sam Miles will be held in New York, May 16. Above is shown the formal memorial circulated by Mr. Miles' former associates in the National Automobile Chamber of Commerce

### Marmon Finance Adjustment Made

More Than \$2,000,000 Involved in Program Reflecting Heavy Loss

INDIANAPOLIS, IND., May 9—Completion of a refinancing program involving more than \$2,425,000 which improves the financial position of the Marmon Motor Car Company was announced Monday by G. M. Williams, president, coincident with the publication of the company's annual report.

This refinancing, actually amounting to \$2,427,829.12, has been accomplished through the cooperation of creditors, half by five-year 5 per cent debenture notes and half by sale of common stock of the company.

For the fiscal year ended Feb. 29, 1932, the company showed a net loss from operations, after depreciation and interest but before extraordinary charges, amounting to \$1,413,100, and after adding extraordinary charges in the amount of \$2,289,740 the net loss amounted to \$3,702,840. The extraordinary charges totaling \$2,289,740.08 represent a drastic write-down of the assets of the company to reflect a conservative valuation under existing conditions.

The balance sheet of the company shows a total net worth as of Feb. 29, 1932, of \$3,061,217.33, including 7 per cent preferred stock in the amount of \$1,000,000 and a common stock equity of \$2,061,207.33.

The company showed total current assets as of Feb. 29, 1932, amounting to \$1,400,891.78 with total current liabilities amounting to \$617,477.66, indicating the favorable ratio of current assets to liabilities of 2.26 to 1.

## Composite Experience of Finance Companies and Automobile Dealers

Compiled by National Association of Finance Companies

	1925	1926	1927	1928	1929	1930	1931
Average Direct Loss Per Repossessed Car *	\$	\$	\$	\$	\$	\$	\$
12 or less equal monthly payments.....	50	65	43	56	60	61	43
13 to 18 equal monthly payments.....	78	94	58	75	83	80	66
Balloon note or over 18 monthly payments	220	158	**	**	112	100	**
Increase of Losses Over Standard Terms	%	%	%	%	%	%	%
13 to 18 equal monthly payments.....	57	44	35	34	38	31	53
Balloon note or over 18 monthly payments	341	143	**	**	87	64	**
Percentage of Repossessions	%	%	%	%	%	%	%
New cars with down payment of 33.3%....	1.2	2.1	2.7	2.8	2.8	3.6	4.4
New cars with down payment of 25%....	3.8	4.0	5.9	4.1	5.1	4.6	5.8
All new cars .....	..	..	..	..	..	..	4.5
Used cars with down payment of 40%....	3.0	4.3	5.2	5.3	5.3	6.5	7.0
Used cars with dwn p'm't of 35% or less	6.2	8.6	6.9	10.9	9.0	9.8	14.6
All used cars .....	..	..	..	..	..	..	11.4
Incr. of Repossessions Over Stand. Terms	%	%	%	%	%	%	%
New cars with down payment of 25%....	122	92	115	46	82	28	32
Used cars with dwn p'm't of 35% or less	105	101	31	93	70	51	108
Average Amount of Note Purchased	\$	\$	\$	\$	\$	\$	\$
New cars, including some commercial..	550	595	574	635	595	567	554
Used cars, including some commercial....	280	277	286	307	296	279	268
Percentage Sold on Instalments	%	%	%	%	%	%	%
New cars .....	68.2	64.5	58.0	58.1	62.6	62.3	62.8
Used cars .....	62.8	65.2	63.1	60.8	65.1	64.8	60.4
All cars .....	65.5	64.8	60.8	59.5	64.0	63.8	61.3
Percentage of Trade-Ins, Sales, Etc.	%	%	%	%	%	%	%
Trade-ins on sales of new cars.....	..	..	72.0	69.4	72.5	75.1	80.2
Trade-ins on sales of used cars.....	..	..	37.1	39.4	45.5	49.1	46.7
Total trade-ins in % of new cars sold....	99.0	90.0	116.0	115.5	127.1	155.5	160.0
Used cars sold in % of new cars sold....	..	..	118.5	117.0	128.6	164.0	170.6
Used cars junked in % of total trade-ins..	..	..	6.9	8.1	9.2	14.3	13.5
Skips per 1000 Transactions.....	..	..	..	4.7	5.2	5.1	5.5
Instalment Paper Ratios	%	%	%	%	%	%	%
Paper with more than 12 monthly paym'ts	18.3	13.2	12.4	14.5	14.9	16.6	17.8
Paper with less than standard down paym't	19.4	9.0	5.2	6.1	8.0	11.8	11.1
New car paper to total paper purchased..	69.0	67.0	73.2	71.6	70.0	63.4	60.1
Used car paper to total paper purchased..	31.0	33.0	26.8	28.4	30.0	36.6	39.9
No. new cars to total financed .....	53.1	48.6	57.6	54.9	54.0	46.2	42.1
No. used cars to total financed .....	46.9	51.4	42.4	45.1	46.0	53.8	57.9
Used car paper per cent with recourse***	..	..	65.8	66.0	66.3	68.5	61.8
Cos. taking all used car paper with rec... Cos. taking part used car paper with rec... Cos. taking all or part u. c. p. with rec... Used car paper above Red Book appr. value	50.0	46.0	36.8	37.6	38.0	38.3	29.8
44.0	40.0	55.6	54.8	56.2	52.4	54.4	..
94.0	86.0	92.4	92.4	94.1	90.7	84.2	..
..	..	..	27.3	29.3	38.9	39.2	..

\* This means amount owing minus amount received from sale.

\*\* No cases reported, or too few to justify inclusion.

\*\*\* Including repurchase agreement.

NOTE: This tabulation represents the composite experience of a large number of representative finance companies.

Some of the above items derived from reports made by many automobile dealers, representative of the whole country, obtained through the courtesy of the National Automobile Dealers' Association.

## Safety Free-Wheeling Units Shipped Abroad

CHICAGO, May 10—The Safety Free Wheeling Company has received two orders which total 500 units from the export field for its standard model of automatic clutch control. Half of them were sent to Berlin and the other half to Paris. First domestic shipments on the company's new and improved clutch control were made several days ago.

## Stewart-Warner Has Loss

CHICAGO, May 10—The Stewart-Warner Corp. reports net loss of \$536,760 for the first quarter ended March 31, compared with net loss of \$331,756 in the first quarter of 1931.

## Briggs & Stratton Earnings

CHICAGO, May 10—Net income of Briggs and Stratton Corp. was \$8,959 after all charges in the quarter ended

March 31, equal to 3 cents a share, against \$196,648 or 65 cents a share in the 1931 quarter. Current assets totaled \$2,260,988, including cash and marketable securities of \$1,805,403 on March 31, and liabilities were \$248,284.

## United Air Has Profit

NEW YORK, May 10—United Aircraft & Transport Corp. reports net income for the first quarter of \$441,445, after providing for taxes, depreciation and minority interests, which, after deducting \$180,000 for preferred dividend requirements, equals 12 cents per share on 2,084,319 common shares outstanding March 31.

A book entitled "Definite Control of Quality" and commemorating the fortieth anniversary of the company has been issued by Hyatt Roller Bearing Co., Harrison, N. J. While giving illustrations of the various types of bearings manufactured by the company, most of the space is devoted to illustrations with brief descriptions of various sections of the manufacturing plant, the inspection department and the laboratories.

## Steel Wage Cuts Divorced from Price

### Automotive Demand Continues Chief Nourishment of Market

NEW YORK, May 12—Intimations that under no circumstances could any part of the savings resulting from downward revision of steel mill wage scales be passed on to consumers followed on the heels of announcement of these wage cuts which become effective on Monday. The test will not come until demand has sufficiently broadened to sharpen competition among the mills. Together with the first cut announced by the leading interest on Oct. 1, 1931, amounting to 10 per cent, the reduction of 15 per cent announced a week ago means a 34-cent general hourly rate as compared with the 44-cent rate which went into effect when the 12-hour day was abolished in 1923 and under which a 40-cent rate was maintained. Before the war the rate was just about half what it was when Judge Gary decided to do away with the 12-hour day.

While a number of the leading "dependents" have announced that they would follow the example of the corporation, revision in the case of mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers is not quite so simple. Wage rates for sheet mill operatives under this agreement are based on sheet prices for the two preceding months. They have been reduced about 3 per cent for the current and next month, the first change since last October. This indicates that actual sales of sheets in March and April were made at prices under these generally quoted and currently heralded as steady.

Automotive demand continues to be the market's chief nourishment. While it is admitted that competition in the Detroit market is keener than elsewhere, prices are generally characterized as steady.

Further shrinkage in the leading interest's backlog, as revealed by the unfilled tonnage statement issued on Tuesday, caused more disappointment in Wall Street than in the steel market, according to observers.

**Pig Iron**—Middle West markets report a slight betterment in demand from automotive foundries. Prices are unchanged.

**Aluminum**—Quiet and unchanged.

**Copper**—Consuming demand slightly better. In the "outside" market electrolytic is available at 5.60 cents, delivered Connecticut.

**Tin**—Selling pressure wiped out in part sharp advances caused by news of a proposed shutdown of all mills during July and August. Straits for prompt shipment was quoted at 21.15 cents at the week's beginning.

**Lead**—Amid moderate demand the market rules steady and unchanged.

**Zinc**—Quiet and easy.

## Most Popular Colors For Finishing Cars\*

April, 1932	Index No.	April, 1931	Index No.
Black .....	196	Black .....	196
Blue .....	167	Blue .....	114
Green .....	70	Green .....	83
Maroon .....	62	Brown .....	81
Grey .....	48	Maroon .....	53
Brown .....	45	Grey .....	43

\* Duco Color Advisory Service.

## Casing Shipments Increased in March

Shipments of pneumatic casings for the month of March amounted to 2,954,040 casings, an increase of 15.7 per cent over February this year, but were 28.3 per cent below March, 1931, according to statistics released by The Rubber Manufacturers Association, Inc.

This organization reports production of pneumatic casings for March to be 3,671,090, a decrease of 5.2 per cent under February this year and 21.3 per cent below March, 1931.

Pneumatic casings on hand March 31 numbered 9,877,823, an increase of 7.7 per cent over February, although 1.4 per cent below March 31, 1931.

The actual figures are as follows:

	Pneumatic Casings	Ship- ments	Produc- tion	Inven- tory
March, 1932..	2,954,040	3,671,090	9,877,823	
Feb., 1932..	2,552,861	3,871,220	9,172,245	
March, 1931..	4,121,531	4,662,576	10,014,490	

## Harrison Leaves Cincinnati Firm

R. E. W. Harrison has resigned as sales engineering director of Cincinnati Milling Machine and Cincinnati Grinders, Inc.

Mr. Harrison has been with the Cincinnati Milling Machine Co. since 1926, at which time he joined the organization as chief engineer and director of Cincinnati Grinders.

## Pulcher Takes Federal Sales

M. L. Pulcher has assumed active charge of sales for Federal Motor Truck Company, following the resignation of Henry Krohn, former vice-president in charge of sales. These duties are taken on by Mr. Pulcher in addition to retaining his position as president of the company.

## Goodrich Names Newman

James J. Newman, formerly president of the Pick-Barth Holding Corp., New York, has been named as assistant to James D. Tew, president of the B. F. Goodrich Rubber Co.

## Dunlop Profits Maintained

LONDON, April 30 (*by mail*)—Although the profits of the Dunlop Rubber Co. for 1931 were surprisingly well maintained, having regard to the depression in, and disturbance of

trade, the directors do not propose to pay any dividend on the ordinary shares, which for 1930 received 6 per cent. The total profit is returned at £1,181,000, against £1,250,000 in 1930. The net profit, after providing for dividend on guaranteed preference shares in subsidiary companies and other charges, comes to £480,000, a decrease of £61,000.

## March Index of Sales by Equipment Makers\*

	Mar. Feb. 1931
Grand index of all shipments	65 64 113
Original equipment shipments	58 61 117
Service parts to wholesalers	107 81 117
Accessories to wholesalers..	52 53 65
Service equip. to wholesalers	62 57 115

\* Compiled by Motor and Equipment Manufacturers Assn.

## Racing Season Opens

PHILADELPHIA, May 11—The Eastern automobile racing season opened Saturday, May 7, on the Langhorne dirt oval, with Bill Cummings taking one of the 25-mile heats and winning the 50-mile feature in fast time. Ninety-three cars were at track-side. This is believed to be the largest entry in the history of American track racing.

At the Roby Speedway, Sunday, May 8, Billy Arnold, winner of the 1930 Indianapolis race, used 3 cars to win three of the nine events scheduled.

## Experimental Rim Sizes

The Tire and Rim Association, Inc., Cleveland, has reported inspection and approval during the month of April of the following experimental rims:

Rim Size	No. Inspected
13 x 5 .00E .....	2,275
15 x 4 .00D .....	76
15 x 5 .00E .....	11,693
15 x 5 .50E .....	11,211
15 x 6 .00E .....	35
16 x 4 .00D .....	95
16 x 4 .50D .....	3,726
16 x 5 .00E .....	131
16 x 5 .50E .....	89
16 x 6 .00E .....	103
Total Inspected .....	29,434

## DeSoto Appoints

L. G. Peed, general sales manager of DeSoto Motor Corp., has announced the following appointments:

Harry Mahaffey, formerly Western sales manager of Oakland Motor Car Co., and John Ballard, formerly director of districts, have been named assistants to the general sales manager. Douglas Herrick has been appointed director of districts. The following three new district managers have been announced: Ross Williams at St. Louis; A. J. Shaeffer at Omaha and E. J. Barlow at Cincinnati.

## Motor Wheel Names Sanford

Glenn A. Sanford has been named sales manager of the Motor Wheel Corp., Lansing, Mich., according to an announcement from J. B. Siegfried, vice-president.

The firm of M. Rozental, C. Tenenblum, and J. Gerson, representative in Poland of American automotive manufacturers, has announced the opening of a new wholesale branch in Warsaw.

## Cady B. Durham Dies at Miami

### Former Buick Executive Was on Sloan's Staff

Cady B. Durham, former vice-president and assistant general manager of the Buick Motor Car Co., died May 10 in Miami, Fla., after an operation for appendicitis. Mr. Durham, who retired from Buick in April, 1929, had been on the technical staff of Alfred P. Sloan, Jr., president of the General Motors Corp. since that time. He was in his sixtieth year when he died.

Cady B. Durham was born at Seneca, N. Y., Dec. 31, 1872. His first position was with the Sibley Fire Engine Co. at the age of 13, where he remained eight months, going to the B. W. Payne Engine Co. He shifted about in his early years, working for the Ball & Woods Works, Pond Tool Works, Cameron Steam Pump Co., Gould Pump Works, McIntosh & Seamer and Straight Line Engine Works. In 1903 he went with the Ingersoll-Rand Co. and in 1909 he joined Buick as assistant superintendent of Buick plant No. 1. In 1912 was promoted to superintendent. During the World War he was in charge of Buick's Liberty Engine plant, and in 1919 was promoted to master mechanic of the Buick factories. He was again promoted in 1920, when he became assistant general manager, a position he held until 1929.

Through his long association in the Buick shops, Mr. Durham had come to know countless workers personally, and, despite his responsibilities, he always made it a point to give of his time to assist any of his men in working out their individual problems. It is doubtful if there was any executive in the industry who had a broader acquaintance with the men who compose the organization of any individual company than had Mr. Durham at Buick.

Besides his activities in the manufacturing field, Cady Durham also found time for civic problems and had been especially active in the Flint Chamber of Commerce and in the Y. M. C. A.

## Dodge Names Ouellette

L. J. Ouellette, formerly assistant advertising manager of Dodge Brothers Corp., has been named assistant to A. vanDerZee, general sales manager. Mr. Ouellette has been with Dodge Brothers for the past 15 years.

## Universal Opens Branches

DETROIT, May 9—Universal Credit Co., authorized Ford finance company, opening branch offices in Los Angeles and San Francisco this month, bringing the total of branches to 33.

May 14, 1932

## Aircraft Production

Report of Aircraft Production from January 1, 1932, to March 31, 1932 (Based on Department of Commerce Licenses, Identification Marks Issued for Unlicensed Aircraft and Reports).

Monoplanes	
Open Cockpit (landplane)	
1-place .....	20
2 and 3-place .....	43
Total open .....	63
Cabin (landplane)	
2-place .....	12
4-place .....	13
5 and 6-place .....	4
10-place and over .....	5*
Total, cabin .....	34
Amphibions .....	1
Seaplanes .....	3
Total, Monoplanes .....	101
Biplanes	
Open Cockpit (landplane)	
1-place .....	4
2-place .....	3
3 and 4-place .....	7
Total, open .....	14
Cabin (landplane)	
1 to 7-place .....	5
Total, cabin .....	5
Total, Biplanes .....	19
Autogiros .....	14
Military airplane deliveries ..	219
Airplanes exported† .....	23
Grand Total .....	376

\*Two multi-engine planes.  
† Does not include planes listed in the above breakdown nor planes exported in 1932 which were manufactured prior to Jan. 1, 1932.

## Bentley Joins Rolls-Royce

W. O. Bentley has decided to affiliate with Bentley Motors (1931), Ltd., of Rolls-Royce, Ltd., in England. When Rolls-Royce took over the Bentley organization last year there was some disagreement between the company and Mr. Bentley on how his services should be apportioned. The Bentley subsidiary of Rolls-Royce has begun development on a new type of sports car and it is understood that Mr. Bentley's activities will be devoted to this end.

## Firestone Executives Pledged to Buy Cars

More than 40 per cent of the men holding pivotal positions in the Firestone Tire & Rubber Co. plants in Akron have pledged to buy new automobiles before July 1 as a part of a nation-wide drive to revive business conditions by the purchase of new automobiles.

## Gears and forgings Operating

CLEVELAND, May 10—The plant of Gears and Forgings, Inc., although in the hands of receivers, is operating in all respects, according to an announcement from R. B. Tripp, general sales manager. The receivers for the company are F. L. Leckie and S. C. Dalbey.

## Hudson, Essex Carry Bendix Clutch Control

Hudson and Essex cars are now being shipped from the factory equipped with vacuum automatic clutch-operating mechanisms, according to an announcement by the Hudson Motor Car Co. While included on all cars, as standard equipment, an additional charge of \$10 is made in the f.o.b. price. The unit is produced by Bendix and is used by Hudson in conjunction with its mechanical free-wheeling unit and synchronizing helical gear transmission. Additional units are available for installation on 1932 cars already in the field, and list at \$10 plus installation cost.

The operation of the mechanism is controlled by the accelerator pedal similar to other Bendix installations. There are two plunger type valves, one controlled by the accelerator to cause engagement and disengagement, and the other to cut the functioning of the unit in or out. The push-pull control for this valve is located on the steering column bracket, so that it can be put into or out of operation independently of the free-wheeling unit. The vacuum operating cylinder is mounted on the top flange of the right frame side rail on the manifold side of the engine.

Operation of the unit is exceptionally good, probably due to the soft engaging action of Hudson's cork insert clutch running in oil.

## Adams-Alemite Suit Settled

NEW YORK, May 11—Adams Grease Gun Corp. has announced that patent suits between it and the Alemite Corp. have been settled and that Adams has been licensed to continue manufacture of Alemite, Zerk, Dot and industrial lubricating systems under Alemite patents. Settlement of the suit concludes five years of litigation.

## F. F. Landis

F. F. Landis, one of the founders of the Landis Tool Co., died May 2. The company was begun in 1889 by F. F. and A. B. Landis, who incorporated it as the Landis Tool Co. in 1897. Neither of the brothers has been active in company affairs in recent years.

## Firestone Pays on Preferred

Firestone Tire & Rubber Co. this week declared the regular quarterly dividend of \$1.50 per share on preferred stock of Series A, payable June 1 to stockholders of record May 15.

## Briggs Reports Loss

DETROIT, May 11—Briggs Mfg. Co. reports net loss of \$953,993 after depreciation, etc., for the first quarter against net profit of \$43,731 for the corresponding period last year.

## Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

**NEW YORK, May 11**—The seasonal improvement in retail trade was, on the average, maintained last week; but competition was keen and price-cutting was widely practiced. Wholesale and jobbing lines were quiet, for retailers continued to order only in small lots. The failure of Congress to accept a definite tax plan to balance the budget constitutes the most unsettling factor in the business outlook. Some uneasiness in commercial quarters has also been aroused by the passage of two bills by the House of Representatives last week. The first calls for the expenditure of \$100,000,000 during the next five years for World War widows' and orphans' pensions; the second the Goldsborough Bill, directs the Federal Reserve Board to conduct its policies with the view of raising commodity prices to the 1921-1929 level.

### CAR LOADINGS

Railway freight loadings during the week ended April 23 totaled 562,380 cars, which marks a decrease of 4394 cars below those during the preceding week, a decrease of 196,123 cars below those a year ago, and a decrease of 344,499 cars below those two years ago.

### ELECTRICITY PRODUCTION

Production of electricity by the electric light and power industry in the United States during the week ended April 30 was 11½ per cent below that a year ago.

### COTTON CONSUMPTION

World consumption of American cotton during March totaled 1,157,000 bales, the largest for any month in more than two years. The consumption trend is downward in the United States, uncertain in Europe, and upward in the Orient.

### FARM PRICE INDEX

The index of prices of farm products on April 15 stood at 59 per cent of the 1910-14 average, as against 61 per cent a month earlier and 60 per cent two months earlier.

### CRUDE OIL OUTPUT

Average daily crude oil production during the week ended April 30 amounted to 2,177,500 barrels, as against 2,267,900 barrels for the preceding week and 2,475,100 barrels a year ago.

### FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended May 7 stood at 61.6, as against 61.8 for both the week and two weeks before.

### BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended May 4 were 30 per cent below those a year ago.

### STOCK MARKET

The prolonged tax discussions in Congress and other legislative developments had a depressing influence on the stock market during the first part of last week. Encouragement was found in President Hoover's rebuke to Congress toward the end of last week, in which he stated that its delay in providing means of balancing the budget was retarding business recovery. The upward movement in stock prices following the President's remarks was sufficient to bring about moderate net gains for the week.

### RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended May 4 showed decreases of \$26,000,000 in holdings of discounted bills and of \$1,000,000 in holdings of bills bought in the open market.

## Reo Announces 1½-Ton Speedwagon Powered With New Gold Crown Six

**LANSING, MICH., May 10**—The Reo Motor Car Co. having developed an additional model of its Gold Crown series of engines, announces a new 1½-ton Reo Speedwagon equipped with this six-cylinder engine and additional to the present Reo four-cylinder 1½-ton truck. The new model is offered in two lengths, Model 1B with a wheelbase of 140 in. selling at \$745, and Model 1D, with a wheelbase of 164 in., selling at \$785. The engine has cylinder dimensions of 3½ by 5 in. and is rated at 68 hp. at 2800 r.p.m., its displacement being 230 cu. in.

The compression ratio is 5.3 and the engine develops a maximum torque of 152 lb.-ft. over a wide speed range between 1000 and 2000 r.p.m.

Cylinder blocks are cast of chrome-nickel iron, and the 2 5/16-in. crankshaft is carried in seven main bearings. Lubrication is through ducts in the crankcase and crankshaft to the crankshaft, crankpin and camshaft bearings. Intake valves are of chrome-nickel and exhaust valves of silchrome steel. Pistons are of Lo-Ex aluminum alloy, and camshaft drive is by a toothed chain.

### A. P. B. A. to Honor Leading Outboardist

**NEW YORK, May 12**—George H. Townsend of the Indian Harbor Yacht Club, president of the American Power Boat Association, ruling body in American motor boat racing, announced today the presentation of the Townsend Medal, to be known as the American Highpoint Outboard Trophy, to be awarded to the leading outboard driver of the country.

The medal will go to the driver who scores the greatest number of points in all regattas and marathons sanctioned by the A.P.B.A. between May 1 and Oct. 31.

### Russell Heads Fargo Rail Sales

**DETROIT, May 12**—Colonel A. C. Downey, president of the Fargo Motor Corp., announces the appointment of D. W. Russell as vice-president in charge of railway sales. He will supervise sales of all Fargo products to railroads and affiliations. Russell joined Fargo last August as railroad liaison representative, previous to which time he was vice-president and general manager of the Southwestern Transportation Co. for three years, and before that with the White Co. for 14 years.

### Thermoid Loss is Less

**NEW YORK, May 12**—Thermoid Co. and wholly-owned subsidiaries report for the quarter ended March 31 a net loss of \$106,685, after depreciation

The chassis of the new 1½-tonner is quite similar to that of the four-cylinder Model 1A. The four-speed transmission provides forward gear ratios of 6.61, 3.55, 1.86 and 1. The rear axle is of the full-floating, spiral bevel-gear type, with straddle-mounted pinion. A ratio of 5.28 is standard on the 140-in. wheelbase model, and 5.83 on the 164-in. wheelbase model, but a ratio of 6.6 is available also. Front springs are 40 by 2 in. and rear springs 50 by 2½ in., both being half-elliptics. Steering is by a cam-and-lever-type gear. Roller bearings are carried in the front wheels and roller thrust bearings on the knuckles.

Brakes are of the two-shoe, hydraulic, internal type, with master cylinders of the self-replenishing type. There are 14-in. drums on the front and 15-in. on the rear wheels and the total braking surface is 246 sq. in. The parking brake is of the contracting band type and acts on an 8-in. drum back of the transmission.

The appearance of the truck is enhanced by an attractive pressed steel V-type radiator shell with vertical grille, and sweeping, one-piece fenders of new design.

and interest, etc., compared with a net loss of \$101,679 for the first quarter 1931.

Current assets, including \$506,286 cash and government bonds, amounted to \$1,919,512 and current liabilities were \$247,430. This compares with cash of \$603,718, current assets of \$2,115,847 and current liabilities of \$333,369 as of Dec. 31, 1931.

### Federal Six-Wheeler

A six-ton six-wheeler has been added to the line of the Federal Motor Truck Company of Detroit. It has a single driving axle, this being the rear one of the two axles of the rear unit. The new model carries a gross rating of 28,000 lb. and is built in three lengths, with wheelbases of 188, 206 and 224 in. respectively, the corresponding prices being \$3,895, \$3,945 and \$4,045.

Power is furnished by a Continental six-cylinder engine of 4 by 4½-in. bore and stroke, developing 80 hp. at 2200 r.p.m. This engine is combined with a Brown-Lipe seven-speed transmission and plate clutch. The new truck is equipped with 20-in. ventilated disk wheels with 34 by 7 in. tires, duals being fitted to all four rear wheels. The rear axle is a full-floating, bevel gear-driven Timken with a standard gear ratio of 7.8. Two semi-elliptic springs, trunnion-mounted to the frame, have their ends connected to the driving and dead axle, one above and the other below each axle. The frame, which has a maximum side-rail section of 7½ by 3½ by ¼ in., carries fish plates as standard.

## Curb on Carriers Unlikely at Present

### Compromise Bill Will be Reported to Current Congress

by L. W. Moffett

WASHINGTON, May 12—Legislation to regulate either motor bus or motor truck transportation appears unlikely at the present session of Congress. It is thought that the only chance for such legislation would lie in the improbability that Congress will reconvene after the national political conventions in June.

Difficulty is still being encountered in framing a bill. The Couzens bill was taken up last week by the Senate Committee on Interstate Commerce. At the same time the Interstate Commerce Commission submitted a long communication together with a proposed bill to the committee. The purpose of the committee now is to weld the two proposals into one measure, eliminating features of both and keeping certain portions of them. Senator Watson, a member of the committee and majority leader, told *Automotive Industries* a bill would be reported at this session, but no prediction was made that it could be enacted.

One conclusion the committee has reached on truck regulation proposal is to adopt the permit system and to leave out the rate provision. In connection with proposed bus regulation it was voted by the committee to continue the hours of service provision, omit the two-driver provision, and leave the safety provision, covering width, length, etc., to state control.

The final bill will define a private carrier to cover trucks, substituting for the term "charter carrier" and exempting trucks not on regular interstate schedules.

Before the Senate takes up the motor and bus regulation legislation, if it reaches it, it will consider the holding company bill reported by the Senate Committee on Interstate Commerce. The bill is similar to the House bill to control rail consolidations and mergers. It would not cover motor lines except as they are indirectly affected when owned by the rail lines.

### Stoughton Semi-Trailers

A line of semi-trailers with four-member straight frames, kick-up frames for vans and tanks, and removable steel platforms, and a line of non-reversible four-wheel trailers have been marketed by the Stoughton Company of Stoughton, Wis. One of the features of the semi-trailers is the rubber mounting of the fifth wheels, the upper part of which is attached to a vertical bracket by two rubber cushion

ions which measure approximately 4 x 4 x 25 in. The rubber blocks are encased in a steel housing which forms the fifth wheel mounting bracket. This construction permits an additional deflection of 5½ in., measured outside of the frame, and absorbs shocks due to coupling, driving and braking.

The king pin lock works automatically, latch pawls holding the pin in position, the pawls in turn being held in position by a wedge-shaped assembly.

Another feature of the trailers is the improved "Ezelift" support which makes it possible to lift supports 19 or 20 in., between frame members, if desired. Power to raise or lower the support is provided by a rack bar which is slid in a steel channel by a worm gear-driven steel pinion. Supports are automatically locked in position by worm-gear action.

Stoughton trailers are equipped with Timken axles carrying Lockheed hydraulic, Bendix mechanical or Warner electric brakes, operated by a B-K booster or a Westinghouse air equipment. Radius rods are bronze-bushed.

### Automotive Units Signed for Chicago

CHICAGO, May 10—In addition to special buildings housing exhibits of General Motors Corp. and the Chrysler Corp., the Chicago Century of Progress Exposition has announced that the following automotive firms will have exhibits in the Travel and Transport Building of the Exposition:

- Cord Corp. and subsidiaries
- International Harvester Co., trucks and tractors
- Packard Motor Car Co.
- Studebaker Corp.
- Clark Tractor Co.
- Walker Vehicle Co.
- Borg-Warner Corp. and subsidiaries
- Timken-Detroit Axle Co.
- Timken Roller Bearing Co.
- Ahlberg Bearing Co.
- Alemite Corp.
- Waukesha Motor Co.
- Standard Oil Co. (Indiana)

The main building of the Travel and Transport group, already erected, is 1000 ft. long. A contract for transporting visitors about the grounds of the Exposition has been signed with the Greyhound Corp., for which General Motors Truck Co. will construct special semi-trailer bus units with modernistic decorations.

### To Sell Fuel Pumps

Nicholas Fodor, a mechanical engineer, has established an office at 75 West St., New York, for the sale of Compur fuel injection pumps and injection nozzles for Diesel engines. These parts are being manufactured by Friedrich Deckel & Co. of Munich, Germany, well known as the manufacturers of Compur shutters for photographic cameras. Compur pumps and injectors are used on the latest type Maybach Diesel engine which operates with mechanical injection.

### General Motors Has 3-5 Trailer

#### New Series Corresponds to T-18 Truck Line

General Motors Truck Company has developed a new semi-trailer which corresponds to its T-18 truck of ½-2 tons rating, employing many of the parts of the latter. The nominal capacity of this trailer is 3-5 tons. A pressed-steel frame with one piece side rails is used; it is 14 ft. long and has a 6-in. drop back of the tractor drive wheels. Sixty per cent of the weight of body and pay load is carried on the trailer axle. There are five pressed-steel cross members in the frame, of the type with integral gusset plates.

Shackles, shackle bolts, bushings, wheels and brake parts are interchangeable with the corresponding parts of the T-18 truck. Springs are 45 in. long and made up of eleven  $\frac{1}{8}$  x 2½-in. leaves. Power brakes are of the B-K vacuum type. A parking brake, which is operated automatically when lowering the support wheels, can be supplied.

The front supporting wheels are raised and lowered by a steel cable and lever arrangement actuated by a crank at the side, which is locked in either position by a dog.

The lower fifth wheel is a GMT, spring cushioned, semi-automatic type of 24-in. size. The upper fifth wheel is integral with the frame and consists of a heavy steel plate extending completely across the frame and back to the second cross-member; it supports a steel bolster and hardened king pin.

Pressed-steel cross-sills, interchangeable with those on the truck, are used in the body construction. Stakes set within the pressed-steel platform base provide an integral rub rail on each side.

### Gillette Rubber Busy

EAU CLAIRE, WIS., May 10—The present production schedule of the Gillette Rubber Co. here is far ahead of a year ago and the plant is being operated on a 24-hour basis with three 8-hour shifts. Tube production is especially active, although automobile and bicycle tire output is well ahead of last year. The machine shop is busy with a full crew, turning out not only the company's own requirements of molds and other machinery, but supplying other tire plants as well.

### Sterling Business Better

MILWAUKEE, May 10—Decided improvement in sales is reported by officials of the Sterling Motor Truck Co. here. The company entered May with more unfilled orders than at any other similar period since the spring of 1930.

# Four Makers Pay Dividends

**Despite Low Profits Manufacturers Able to Show Some Earnings**

(Continued from page 712)

not available on the other companies, Daniel Starch, writing in the May 1 issue of *Forbes*, gives the following interesting comparison of the number of stockholders in automotive companies in 1931 as compared to 1930.

#### Total Stockholders

	1931	1930
General Motors....	322,740	273,310
Packard .....	104,756	86,900
Studebaker .....	32,119	30,557
Nash .....	22,957	20,128
Ford of Canada..	24,295	22,885
Willys-Overland ..	22,350	22,422

While these almost universal increases reflect partly the lower prices of the various stocks and the consequent ability of more small investors to participate, they unquestionably reflect also a high degree of confidence in the ultimate prosperity of the automobile industry.

With payrolls reduced to a minimum, expenses cut to the bone, and sales effort per man increased to a maximum, the industry is fighting today as never before to merit that confidence. Great progress is not in the cards for the second quarter. But upturn of other lines of business whose seasonal peak is reached in summer may permit some element of advance before the time of our own next normal seasonal peak in 1933. Here's hoping!

## Flexible Intercity Coach

In announcing its Model 1721 IL intercity coach, the Flexible Co. of Loudonville, Ohio, states that it is designed for high sustained road speeds. It is equipped with an eight-cylinder in-line valve-in-head engine which develops a maximum torque of 261 lb.-ft. at 1400 r.p.m., and a maximum power of 113 hp. The bus weight is 84 lb. per hp., which is said to account for the high speed.

The drive is so designed that when the bus is unloaded there is an angle of 3½ deg. between connected shafts, but under full load the entire drive is in a straight line. The rear axle is bevel-gear driven and the bevel pinion is straddle-mounted and can be adjusted by means of shims. There are nine equally spaced crossmembers in the frame, and outriggers are secured to the side rails in line with the cross members.

The fuel tank is so mounted that it can be readily removed after taking out six bolts. Following are some of the principal dimensions of this bus: Wheelbase, 203 in.; headroom, 72 in.; width of single seats, 20 in.; width of double seats, 38 in.; seat spacing,

## Entries in the 500-Mile Indianapolis Race

Entrant	Car	No of Cyl.	Driver
Harry Hartz	*Miller-Hartz Spl.	8	Billy Arnold
Juan A. Gaudino	Golden Seal Spl.	8	Juan A. Gaudino
John B. McPherson IV	McPherson-Kalen Spl.	8	George Kalen
Frank Brisko & D. Atkinson	*Brisko-Atkinson Spl.	8	Frank Brisko
George W. Howie	*Howie Spl.	8	George Howie
Alden Sampson, 2nd	Sampson Spl.	16	Louis Meyer
Russell Snowberger	Hupp Comet	8	Russell Snowberger
Mikan-Carson-Gardner	*Allegheny Metal Spl.	8	Wm. "Speed" Gardner
Boyle Motor Products	Boyle Valve Prod. Spl.	8	Unnamed
Buddie Marr	Hudson Spl.	8	Chester Miller
Buddie Marr	Hudson Spl.	8	Al Miller
Leon Duray	†Unnamed	16	Leon Duray
Paul P. Bost	*Empire State Spl.	8	Paul Bost
B. L. Schneider	Bowes Seal Fast Spl.	8	Lou Schneider
B. L. Schneider	Bowes Seal Fast Spl.	8	Unnamed
The Studebaker Corp.	Studebaker Spl.	8	Unnamed
William Cantlon	Lion Head Spl.	4	Wm. Cantlon
Louis Meyer	Jadson Spl.	8	Bob Carey
Four Wheel Drive Auto Co.	†Unnamed	8	Unnamed
George A. Henry	Unnamed	8	J. E. Russo
Buddy Callaway	Unnamed	6	Buddy Callaway
Georgia B. Hall	Duesenberg Spl.	8	Ira E. Hall
George S. Garrard	All American Spl.	8	Unnamed
Coleman Motors Corp.	†Coleman 4-Wheel	8	Fred Merzney
	Drive Spl.	8	Cliff Durant
Harry Hartz	*Miller-Hartz	8	Eugene Haustein
Fronty Sales Co.	Unnamed	4	Wesley Crawford
Boyle Motor Products Co.	*Boyle Valve Prod. Spl.	8	Barney McKenna
Andrew Finneran	Finneran Spl.	4	Deacon Litz
John Rutner	Unnamed	8	Leon DeHart
Ethel Mae Morton	Unnamed	8	Arval Brunmire
Allen Guiberson	Guiberson Spl.	4	Phil Shafer
Phil Shafer	Shafer Eight	8	Roy W. Painter
Lupasa Company	Unnamed	8	Unamed
Wm. H. Richards	Richards Spl.	8	Unamed
Tulio Gulotta	Marr Spl.	8	Unamed
The Studebaker Corp.	Studebaker Spl.	8	Unamed
The Studebaker Corp.	Studebaker Spl.	8	Unamed
The Studebaker Corp.	Studebaker Spl.	8	Unamed
The Studebaker Corp.	Studebaker Spl.	8	Unamed
Henry W. Maley	Unnamed	8	Unamed
Charles Burgett	C. B. Special	8	Freddie Winnai
George Wingerter	Duesenberg	8	George Wingerter
E. D. Stair, Jr.	Folly Farm Spl.	8	Unamed
Jack Mertz	Mertz Special	8	Jack Mertz
Steward Leipert	Leipert-Miller Spl.	8	Malcolm Fox
F. E. Clemons	Hoosier Pete Spl.	8	Billy Winn
Ralph Hepburn	Unnamed	8	Wilbur Shaw
C. D. Harrison	Unnamed	4	Al Gordon
Fred Frame	Duesenberg Spl.	8	Fred Frame
Art Sparks-Paul Weirick	Gilmore Spl.	4	"Babe" Stapp
Bess White	Unnamed	4	Ernie Triplett
Harry A. Miller	†Harry Miller Spl.	8	Unamed
Harry A. Miller	Harry Miller Spl.	16	Bryan Saulpaugh
Milton Jones	Unnamed	4	Milt Jones
Milton Jones	Unnamed	4	Unamed
Alvin R. Jones	Unamed	8	L. L. Corum
Kleinschmidt-Rigling	Unamed	8	Unamed
Frederic P. Duesenberg	Unamed	8	Unamed
Aiken-Howard	Unamed	8	Unamed
S. C. Goldberg	Unamed	16	Unamed
M. A. Yagle	Miller Spl.	8	Zeke Meyer
Virgil O. Williams	Duesenberg Spl.	8	Milt Marion
Steve Gregory	Unamed	8	Unamed
Ray T. Brady &	Brady & Nardi	8	Al Aspen
Gabriel Nardi	Brady Spl.	8	Geo. Doc Mackenzie
Ray T. Brady	Unamed	4	Sam B. Ross
Wm. Yahr	Unamed	8	Marion M. Trexler
Albert H. Walker	Unamed	8	Unamed
Arthur Chevrolet	Unamed	8	Unamed
Harold Brooks	Brooks Romo Spl.	8	Unamed
Sam Greco	Samcliff Spl.	8	Unamed
Louis A. Blair	L. B. Spl.	9	Claude Burton
Louis Katz	Duesenberg Spl.	8	Jimmie Patterson

\* Front Drive

† Two-Cycle

‡ Four Wheel Drive

32 in. centers; aisle width, 18 in.; dimensions of inside luggage carriers, 126.5 by 16.5 by 20 and 126.5 by 16.5 by 26 in.; maximum section of frame side rail, 9 by 3 by ¼ in.

## DeVaux Appointments

GRAND RAPIDS, MICH., May 10—Continental - DeVaux Co. has announced the appointment of the following men to manage DeVaux 80 sales.

R. H. Mulch, general sales manager; F. C. Stowers, assistant sales manager in charge of the Eastern division; G. R. Morris, assistant sales manager in charge of the Western division; F. E. Kennedy, district man-

ager with headquarters in Philadelphia; O. E. Lewis, district sales manager with headquarters in Boston; E. S. Jones, regional sales manager in charge of Pacific coast sales; O. E. Brown, sales development manager; Harry S. Applegate, district sales manager in charge of sales in Ohio, Kentucky and Western Pennsylvania; H. P. Miller, district sales manager for Michigan; C. P. Henderson, district manager of sales in the Pacific Northwest and M. H. Carpenter, district sales manager for lower Michigan and surrounding territory.

More than 650 DeVaux dealers and distributors now handle the Continental-DeVaux franchise in all parts of the country.

## G. M. Boosts Sales To 81,573 in April

### Nearly Doubles Consumer Sales of Preceding Month

NEW YORK, May 12—General Motors sales of cars to consumers in the United States totaled 81,573 for April, as against 48,717 in March and 135,663 in April, 1931.

Sales of cars to U. S. dealers totaled 69,029 as against 48,383 in March and 132,629 in April a year ago, the corporation reported.

April sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totaled 78,359, as against 59,696 in March and 154,252 in April a year ago.

Above is a tabulation of General Motors monthly sales for 1929, 1930, 1931 and 1932 to date. The figures are segregated to show:

Sales of General Motors cars to consumers in the United States;

Sales of General Motors cars to dealers in the United States, and

Total sales of General Motors cars to dealers in the United States and Canada plus overseas shipments.

Unit sales of Chevrolet, Pontiac, Oldsmobile, Buick, LaSalle and Cadillac passenger and commercial cars are included in the above figures.

### Allis-Chalmers Elects

Gen. Otto H. Falk, president of the Allis-Chalmers Mfg. Co., Milwaukee, for nearly 20 years, was elected chairman of the board at the annual meeting of directors May 6, and Max W. Babb, vice-president and general attorney, was promoted to the presidency. Gen. Falk will continue his active connection with the company and supervision of his affairs. His retirement from the presidency was at his request and to relieve him of some of the detail duties of that office. William Watson, general works manager, and William A. Thompson, comptroller and secretary, were elected vice-presidents. Arthur R. Dill, treasurer, was given the additional duties of secretary, and J. A. Keogh, general auditor and assistant secretary, was elected comptroller. Mr. Babb, a graduate of the University of Michigan law school in 1897, joined Allis-Chalmers as attorney in 1904. He was elected a director and member of the executive committee five years ago.

### Produces Indium in Bulk

UTICA, N. Y., May 10—William S. Murray, a chemist of this city, announced this week that he has developed processes which permit of producing the hitherto rare metal indium

#### GENERAL MOTORS SALES TO CONSUMERS IN UNITED STATES

	1932	1931	1930	1929
January	47,942	61,566	74,167	73,989
February	46,855	68,976	88,742	110,148
March	48,717	101,339	123,781	166,942
April	81,573	135,663	142,004	173,201

#### SALES TO DEALERS IN UNITED STATES

	1932	1931	1930	1929
January	65,382	76,681	94,458	95,441
February	52,539	80,373	110,904	141,222
March	48,383	98,943	118,081	176,510
April	69,029	132,629	132,365	176,634

#### TOTAL SALES TO DEALERS IN U.S. AND CANADA PLUS OVERSEAS SHIPMENTS

	1932	1931	1930	1929
January	74,710	89,349	106,509	127,580
February	62,850	96,003	126,196	175,148
March	59,696	119,195	135,930	220,391
April	78,359	154,252	150,661	227,718

in quantity at moderate cost. He claims that his work takes the metal definitely out of the "gram" class and places it in the "ounce" class. The ore from which it is refined yields about an ounce to the ton, but in addition to the indium it contains gold, silver, lead and other metals which can also be recovered. The present price is about \$240 per ounce, but according to Murray, the price will be greatly reduced when quantity manufacture begins. Among other uses it is believed that indium can be applied with advantage to the "silvering" of automobile headlights, since it is non-tarnishable. It may also find a use for finishing interior hardware, replacing silver, to which it is superior because of its non-tarnishing properties. Indium is a white, lustrous metal, very soft and ductile, and is slightly heavier than zinc.

### Foote-Burt Profits

CHICAGO, May 10—Foote-Burt Co. reports net income after all charges including depreciation and taxes of \$70,049 for the quarter ended March 31 last, compared with net loss of \$67,355 in the 1931 quarter. These earnings equal 71 cents a share on the common stock. The quarter is the first in a year in which the company has reported a net income.

A manufacturing profit of \$84,475 is shown for the first quarter against a deficit of \$65,506 in the 1931 period.

### Ainsworth Reports Loss

CHICAGO, May 10—Ainsworth Mfg. Co. reports net loss of \$49,257 after all charges for the quarter ended March 31, compared with loss of \$35,-233 in the 1931 period.

### ++ CALENDAR OF COMING EVENTS ++

#### FOREIGN SHOWS

Budapest, International Fair...	May 7-16
Buenos Aires, Automobile Show...	May 20-29
Belfast, Commercial	May 25-28
Bordeaux, Fair	June
Cork, Commercial	June
Inverness, Commercial	June 21-24
Southampton, Commercial	July 5-9
Llandrindod, Wales, Commercial	July 20-22
London, Olympia Show	Oct. 13-22
Glasgow, Scottish Motor Show	Nov. 11-19

#### CONVENTIONS

U. S. Chamber of Commerce, San Francisco, Cal.	May 16-20
American Iron & Steel Institute, New York (Semi-Annual)	May 19
National Battery Mfrs. Assn., Chicago, Ill.	May 19-20
Automotive Engine Rebuilders Assoc., Indianapolis	May 30-June 2
Natl. Automobile Chamber of Commerce, New York (Annual Meeting)	June 2
American Soc. Mechanical Eng. (Natl. Aeronautic Meeting) Buffalo	June 6-8
American Soc. Mec. Eng. (Natl. Oil & Gas Meeting) State College, Pa.	June 8-11
Pacific Coast Aero. Meeting (A. S. M. E.), Berkeley, Calif.	June 9-10
Soc. of Automotive Engineers, White Sulphur Springs (Summer Meeting)	June 12-17
American Society for Testing Materials, Atlantic City (Annual Meeting)	June 20-24
Amer. Soc. Mechanical Engineers, Bigwin, Canada (Semi-Annual Meeting)	June 27-30

#### Natl. Association of Taxicab Owners, Chicago

July 7-8

#### Natl. Team & Motor Truck Owners Assoc., Chicago (Annual)

July 17-19

#### National Team & Motor Truck Owners Assn., Detroit

July 17-19

#### S.A.E. Aircraft Meeting, Cleveland

Aug. 30-Sept. 1

#### American Society Mechanical Engineers, Cleveland, O. (Machine shop practice meeting)

Sept. 12-17

#### American Trade Association Executives, Atlantic City (Annual)

Sept. 15-17

#### Natl. Assoc. of Motor Bus Operators, Chicago

Sept. 22-23

#### Amer. Society for Steel Treating, Buffalo

Oct. 3

#### National Safety Council, Washington, D. C.

Oct. 3-7

#### American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting)

Oct. 3-8

#### S. A. E. Annual Transportation Meeting, Toronto

Oct. 4-6

#### American Gas Association, Atlantic City (Annual)

Oct. 10-14

#### American Society Mechanical Engineers, New York City (Annual Meeting)

Dec. 5-9

#### Natl. Exposition of Power & Mechanical Engineering, New York

Dec. 5-10

#### RACES

#### Indianapolis

May 30

#### Detroit

June 5

#### Altoona

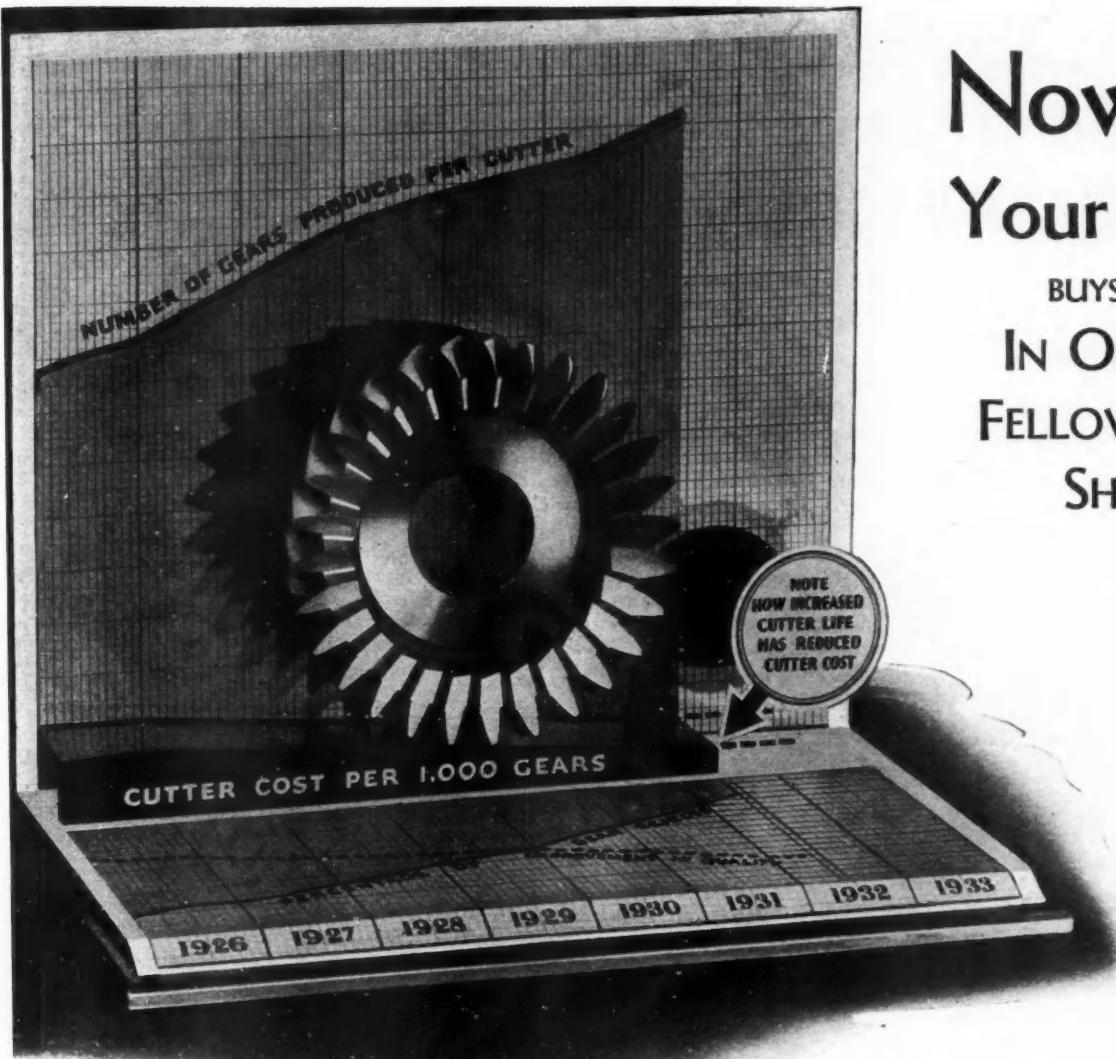
June 12

#### Roby, Ind.

June 19

#### Altoona

Sept. 5



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**F**CONTINUOUS improvements in the quality and accuracy of Original Fellows Gear Shaper Cutters now assure you more gears per cutter, lower cutter cost per gear, and fewer gear rejects.

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# FELLOWS ~GEAR SHAPERS~

FOR YOUR OWN PROTECTION—INSIST ON ORIGINAL FELLOWS GEAR SHAPER CUTTERS

*Automotive Industries*

May 14, 1932

# NEW DEVELOPMENTS

## Automotive Parts, Accessories and Production Tools

### Collets and Shell End Mill Arbors

The Cincinnati Milling Machine Co., Cincinnati, announces a new line of quick-change collets and quick-change shell end mill arbors to be used with the new quick-change adapter. The adapter is readily mounted on the nose of any milling machine having a 5 1/16 in. diameter standard spindle nose with the national standard taper hole (3 1/2 in. taper per foot).



The collet (or arbor) is inserted in the adapter until its taper fits snugly into the non-sticking taper hole of the milling machine spindle. Accurate alignment is maintained because the collet is seated in the spindle taper hole by end pressure that is produced by the nut.

This new arrangement makes it possible to perform a variety of operations—drilling, boring, end milling, face milling or shell end milling on a piece of work with but one setting.

### "Cimatoool" Grinding and Boring Chuck

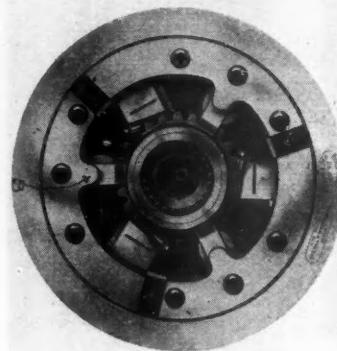
The Cimatoool Bolender grinding and boring chuck for helical gears has been announced by City Machine & Tool Works, Dayton, Ohio. Although developed especially for helical gears, it is said to be equally efficient for spur gears.

On spiral gears the chuck is loaded in the conventional manner, and when the operator releases the draw bar, instead of the jaws immediately chucking, the part is automatically brought back by three fingers which first turn from position A to position B as

shown. After turning across the face of the gear these three fingers pull backward, bringing the back side of the gear, which has been machined or green ground at right angles with the gear face, firmly against three cross-bar buttons located in a parallel plane in the body of the chuck. Although the gear is held back firmly, preventing any forward or backward motion, it is permitted a sidewise movement in every direction, so that in the second stage of the automatic operation the jaws of the chuck come in and accu-

rately center it up. This grinds it concentric with the locating points.

By this method the use of pins enables chucking on the pitch diameter



and eliminates any necessity for grinding or locating from the O.D. Other means of locating, such as flexible pins, cage of balls, or tooth segments, can also be utilized on this chuck where considered desirable.

### Timken Wear and Lubricant Tester

A testing machine for determining the coefficient of friction with different lubricants under different conditions of bearing load and speed of rotation and for determining the wear on test blocks under different conditions has been developed for the market by the Timken Roller Bearing Co., Canton, Ohio. A diagrammatic illustration of the device is shown herewith.

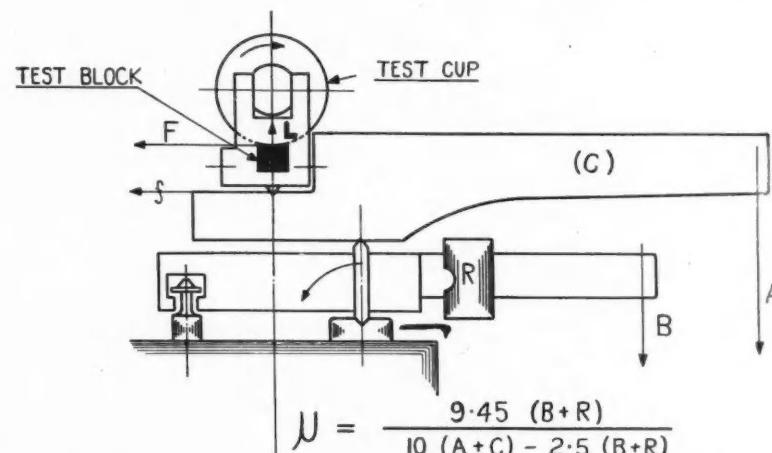
The normal load on the test piece due to weight A on the end of the load lever creates a friction force at right

lever until it is just balanced, that is, until it just leaves the stop pin. The coefficient of friction may then be calculated from the equation

$$U = \frac{9.45 \times (B + R)}{10 \times (A + C) - 2.5(B + R)}$$

where   
 A = Load on end of top lever.  
 B = Load on end of friction lever.  
 C = Load lever constant.  
 R = Friction lever sliding weight

or it may be determined directly from a chart accompanying the machine.



angles to the normal load depending on the rubbing speed, pressure and lubricant used.

This load in turn creates a load on the knife edge at the top of the friction lever. This tends to rotate the friction lever in a counter-clockwise direction, which rotation is resisted by a stop pin fixed to the base of the machine. To measure the friction, weights B are added to the bottom

Wear tests can be conducted by using either straight-face or curve-face test blocks. The weight of the test specimens should be taken before and after test run to determine the amount of metal removed during the test. If straight-face blocks are used, the width of the worn surface can be measured and compared directly against one another for the relative amount of wear.